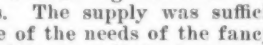
GLEANINGS IN BEE CULTURE
APRIL, 1924

EDITORIAL

Where Comb Honey is Needed.

THE fact that comb-honey prices did not advance much last season on account of the shortage of the comb-honey crop is at least partly explained by noting where comb honey is now being marketed. The shortage of the comb-honey crop last season was largely among smaller producers in the northeastern part of the country who sell their crops locally. Comb honey from the western states came into the eastern markets as usual and supplied the trade already established by dealers. This means that comb honey did not find its way to the smaller groceries in the smaller towns. The supply was sufficient to take care of the needs of the fancy trade in the cities supplied through regular dealers, hence the price did not advance. Apparently the market as it exists today does not need more comb honey, but the smaller groceries do. In other words, the general honey market would be better off if those who are located where comb honey can be produced advantageously and where it can be sold locally would produce enough comb honey to supply their own locality. This applies largely to beekeepers in the northeastern portion of the United States. In this region beekeepers who have talent for selling honey should produce or purchase enough comb honey to keep every grocery in his territory supplied with comb honey throughout the year. This would not interfere to any great extent with the sale of extracted honey, and would result in a large increase in honey sales.



Shortage of Moisture in the West.

THE shortage of snow in the mountains in portions of the West, particularly in California and Utah, is serious, and, unless an unusual amount of snow is stored on these mountains within the next few weeks, there will be a shortage of water for irrigation purposes during the summer. This may seriously affect the honey crop in several western states this season. While eastern beekeepers will sympathize with their fellow-workers in the West, a shortage of the honey crop in important producing centers in the in the West should encourage eastern beekeepers to bend every effort toward securing the greatest possible crop of honey; for, if the western crop is short, eastern honey should find a more ready market than during the past few years. Apparently the bees have wintered well throughout most of the country and the prospects in the East are better than they have been for several years. However, many colonies were permitted to go into winter quarters short of stores and will need to be fed this month or next. Wherever there is a possibility of colonies being short of stores, they should be examined on the first warm day, and fed if necessary.

Popular Ideas Concerning Honey.

THE Editor was honored recently by being invited to a dinner attended by 50 or more members of the faculty of a great university where by special arrangement comb honey and hot biscuits were served. The way the honey disappeared, the requests for "just another taste" after the supply was exhausted and the many inquiries as to where and how honey can be purchased were in strange contrast with the problem now uppermost in the minds of beekeepers as to how to dispose of their product. Several said that they had been able to purchase a little honey from a local beekeeper last fall, but that the beekeeper's supply was exhausted long ago. Many did not know that honey can usually be purchased at the stores, and pointed out what is too often true that they had not seen any in their local grocery. Here were men and women with more than ordinary intelligence who thought that honey is a luxury so rare that it is obtainable only occasionally! Does not the fault lie largely with the local beekeepers who permit their supply to become exhausted early in the fall and make no further effort to keep honey before their customers until the next crop is available, while others have a surplus begging for a market?

MENTION has already been made several times in these columns of the tremendous possibilities of county associations in the eradication of the brood diseases. In several instances county associations have come into existence for this express purpose, and have succeeded in practically eliminating the brood diseases from the county. This is a kind of co-operation that brings immediate results.

County Associations Fight Brood Diseases.

The Editor was agreeably surprised recently when attending two county association meetings in Indiana to note that these counties had arranged to have a key man in each township whose business it is to locate all the bees in his township and chart each apiary on a map of the township. These key men appeared at the meetings, each with his map showing the location of every apiary in the township. It is also the business of these key men as well as every member of the association to look for disease in very nook and corner of their township, so that the association will be kept informed as to any outbreak of disease anywhere in the county. In this way the county association takes over the work of inspection to a large extent and calls on the state inspector only when help is needed to eradicate disease in the case of a beekeeper who harbors disease and opposes inspection, or when a considerable number of diseased colonies are found.

Several years ago the work of organizing county associations in Indiana was begun by the bee inspection department of the office of the state entomologist in order to help the beekeepers to help themselves in the eradication of disease by this kind of co-operation. This work has been going on quietly until most of the important honey-producing counties are now organized in such a manner that the state apiary inspector has available almost complete information as to the disease situation in the state. As a result large areas have been cleaned up entirely, and the amount of diseased colonies in the state has been surprisingly reduced. This organization work is done during the winter when apiary inspection is not possible. This work has been largely planned and carried out by C. O. Yost, who has charge of apiary inspection for the state under the direction of Frank N. Wallace, state entomologist. Like charity, disease-eradication work "begins at home" and the sooner beekeepers realize this and take steps to eradicate the disease locally the better it will be.

Shipping Nuclei into Canada Prohibited.

THE Canadian government by a "Ministerial Order" has prohibited the importation of bees on combs as well as used and second-hand hives and bee supplies. The importation of bees in combless packages is also prohibited unless such packages are accompanied by a declaration signed by the shipper that the food supplied to the bees carried in the package is free from disease. This order became effective on and after March 20, 1924.

Since bees will begin to move from the southern states into Canada this month, there is no time to lose by those who have ordered bees on combs from the South to cancel their orders and have the bees shipped in combless packages. Neither is there any time to lose on the part of shippers in changing the style of their packages and making the necessary arrangements for a signed declaration to accompany each package that the food supplied the bees and carried in the package is free from disease. If nuclei or package bees without the proper declaration as to food being free from disease are started to Canada, such shipment will, no doubt, be stopped at the border and result in loss of the shipment.

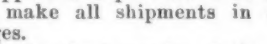
We understand that this blanket order for the entire Dominion of Canada has been brought about by the insistent demand on the part of beekeepers in western Canada where beekeeping is now developing by leaps and bounds and thousands of packages of bees have been imported during the past few years. If these importations had been confined to combless packages shipped with food known to be free from disease, all would have been well; but many shipments were made of bees on combs since it was thought a better start could be obtained with nuclei than from combless packages. Not only have the nuclei failed to prove better than packages, but many fresh outbreaks of American foul brood have been traced to such shipments according to G. B. Gooderham, Dominion Apiarist. In discussing this phase of the question we quote Mr. Gooderham as follows:

> With proper care and feeding, combless packages of bees will travel equally as far and in as good condition as will bees on combs. With proper management after arrival they will build up into strong colonies equally as fast and give practically the same results as can be obtained from nuclei.

In this connection the attention of shippers and purchasers of bees should be called to the fact that several of the northern states prohibit the shipment of bees on combs into the states. We had

hoped to have complete data as to which of the states prohibit the shipment of bees on combs for this issue of Gleanings, but there is so much confusion in regard to the matter and so many new orders going into effect that this would be difficult to do. A new regulation in North Dakota, effective April 1, prohibits the shipment of bees into that state except in combless packages, and several state inspectors have declared a quarantine either for the entire state or for portions of the state. The safest rule for shippers and purchasers of bees will be to make all shipments in combless packages.

As to the food supply of the package bees, it is not safe to ship bees on candy that is made from honey and powdered sugar, unless one can certify that the honey was produced in an apiary free from disease. The safest solution of this problem is to make the candy of invert sugar or use syrup for feeding the bees en route.



Sterilizing Diseased Combs.

IN his article in this issue, pages 230 and 231, J. L. Byer brings up some important questions concerning the use of the alcohol-formalin solution in sterilizing diseased combs, and gives some excellent advice gained from his experience in using this solution.

Working with the alcohol-formalin solution in winter time is quite a different problem from that of handling it in the summer when the windows will be wide open so that the fumes are carried away rapidly. Mr. Byer is certainly right in his conclusions that the combs should not be shaken when first taken out of the solution as was formerly advised, but put directly into the extractor. This applies especially when this work is done in the winter on account of the disagreeable fumes that result from shaking the major portion of the solution from the combs before putting them into the extractor. Mr. Deyell, who has sterilized a lot of extracting combs during the winter here at Medina, came to the same conclusion after he had tried shaking one or two batches of comb.

Dr. Hutzelman formerly recommended that when the combs are put into the solution they be tipped first to one side then the other to allow the air bubbles to escape from the cells. When Mr. Barber designed the large tanks illustrated in the November issue of Gleanings, he arranged to have them filled after the combs were put in place, which gave no opportunity for releasing any air bubbles that might be entrapped in the cells. We were at one time somewhat concerned about these air bubbles that do not all escape when the comb is held stationary in a vertical position and the liquid allowed to fill the tanks. The fact that Mr. Barber had no recurrence of disease on returning the treated combs to the bees led us to investigate further the action of these air bubbles.

By placing drop after drop of the solution on the lower cell wall at the mouth of the cell and watching its action through a magnifying glass, the solution could be seen as it crept inward on the lower cell wall, then upward on the sides as well as the base of the cell and finally along the upper cell wall until the entire inner surface of the cell was covered with a film of the solution. A similar careful study of the air bubbles that do not escape from the cells showed that they are completely surrounded by a film of the solution so that there is no spot on the inner walls of the cell that is not wet with the solution. Since air bubbles do not touch the walls of the cells even at the top, it is not necessary to go to the trouble of changing the position of the combs to allow them to escape. The alcohol in every case drives out enough of the air so that it is in contact with the walls of the cell throughout.

As a further test we selected some of the worst combs we could find and immersed them in the solution for 48 hours without being disturbed to release any air bubbles remaining in them, then sent one to the bee culture laboratory at Washington for examination. The report came back that the spores had been entirely killed. One of these combs was photographed and illustrated on page 87 of the February issue of Gleanings.

In regard to the possibility of a residue of formalin being left in the combs sufficient to taint clover honey that is stored in them, no such tainting was noticed in the experiments last summer and none has been reported thus far. As a further test we have tried the experiment of filling combs that had been through the solution, and then aired for a few weeks, with water and with warm honey. After several days the water was taken out and tasted. The honey was dug out, wax and all, to taste. In no case could any taint be detected.

In this connection should be mentioned the fact that Dr. Hutzelman has repeatedly stated that alcohol denatured with violent poison which adheres to beeswax can not safely be used in making the alcohol-formalin solution for sterilizing combs. Both pure grain alcohol and formalin are very volatile, and when a properly made solution is used the residue left in the combs should evaporate completely after a few weeks of airing.

HOMEMADE STERILIZING APPARATUS

By E. R. Root

How to Convert Ordinary Second-hand Honey Cans to Tanks for Treating Diseased Combs

About the only serious complaint that has been raised against the Hutzelman solution for sterilizing combs affected with foul brood has been the cost of the apparatus. The objection has also been raised that, while the large beekeeper could apply the treatment, the small one could not do so, for the want of a special tank suitable for holding a set of combs.

I am happy to inform our readers that these objections have been successfully

Fig. 1.—The top or bottom of the ordinary 5 gallon honey can is cut with the hive-tool and a hammer.

overcome. About a month ago it occurred to me that a 60-pound or 5-gallon second-hand honey can—something that almost every beekeeper has or can easily obtain—could be converted into a container for soaking standard Langstroth combs.

There are two or three ways for accomplishing this; but perhaps the simplest is to take a common ordinary hive-tool, cold chisel or a can opener and cut out the top of an ordinary square can. The illustration in Figure 1 shows how this may be done with a common hive-tool and hammer. After the top is cut out, the folded edges should be pounded down so there will be no sharp cutting edge. This can is now ready for holding enough solution to soak, one end at a time, a set of seven combs as shown at the right in Figure 3.

By the way, I do not suppose that father Langstroth knew, when he decided on the depth of his frame, that it would be just right to go into a 60-pound can in the manner I have explained. Neither do I suppose that, when the can-makers settled on the dimensions of the 5-gallon square tin, they had a thought of the beekeeper, and much less any idea of making the inside dimensions so that a Langstroth frame could easily slide down into it when the top was removed. The coincidence is, nevertheless, remarkable.

The ordinary 5-gallon square can unless lengthened out will soak, as explained, a little over half of the combs at a time. After one end of the combs has been soaked for 48 hours they can be pulled out and turned the other end down for another 48-hour soaking, thus sterilizing both ends of the combs. To do the complete job of sterilizing will take four days; but that is no serious objection to the beekeeper with three or four colonies. While the combs are soaking it is necessary to hold them down with a weight. One or two bricks will answer.

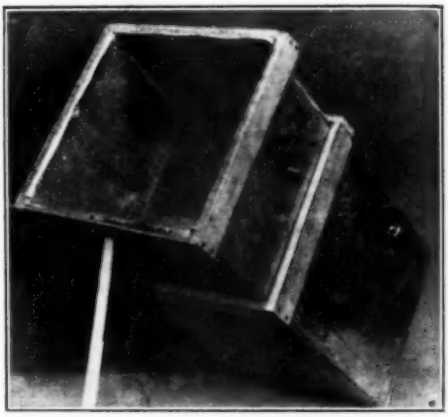


Fig. 2.—Half of one can is spliced on the top of another to make it deep enough to take standard combs standing on end.

How to Splice Ordinary Square Honey Cans.

But there is a much better way for sterilizing combs all at one soaking, and still use second-hand square cans for the purpose. The makers of the square can, when they were making up the depth of their cans, did not know that they had adopted such a dimension that by cutting one can transversely through the middle we can take one of the halves and splice it on to another full can and thus make a can and a half, or one deep enough to submerge the full length of a Langstroth frame and yet leave room enough for an inch of solution over the end-bars. The method of doing this is as follows:

Select three cans. Cut out the tops of two of them with a hive-tool as shown in Figure 1. Now with a pencil draw a line transversely at the half-way point clear around the third square can. Drive one corner of the hive-tool through the pencil line on one side; then work this hive-tool back and forth, can-opener fashion, in such a way that it will cut clear around on the pencil line. It may be more convenient for some to do this by using a hammer. When the can is cut in halves we shall have two square cans exactly half depth. One end will have a screw-cap in it, and the other will have the bottom. Both of these ends must be removed as shown in Figure 1. Now with the hammer pound down the cut edges so they will be smooth. Stand one of the halves or rings on the end of what was once the top or bottom. With the hive-tool cut a little slit about ¾ of an inch down at all four corners. The object of this is to make it possible to spread the sides of this ring so that it will telescope down on top of one of the full-depth cans out of which the top has been cut.

If you desire to do a real nice job, and at the same time provide a handle by which the can may be lifted, cut four strips of wood ⅜ inch thick, and long enough to make up a wooden rim that will slip over the joint where the two cans come together. Place this wooden rim, after it is nailed together, so that it will cover the joint. Lay the can on its side and drive tacks from the inside through the overlapping edges that have been spliced together and into the wood rim. The tacks will hold the edges down, and at the same time make a nice joint for soldering. After the rim has been tacked on all four sides in the inside, any one who can handle a soldering iron can solder the edges along the line of splicing. We shall then have a can like that shown in the middle of the front row in Figure 3 and in Figure 2, except that an additional wood rim has been added at the top. For this idea I am indebted to Mell Pritchard.

This is one way of splicing out a square can so as to make two out of three. This is a plan by which one handy with a soldering iron can do the whole job; and if one's time is worth 50 cents an hour he can in one day easily make ten full-depth cans so that 70 combs can be completely submerged at one time, at a cost not to exceed five dollars for the whole equipment. But not every one can use a soldering iron; some will have to call on the tinsmith.

Fig. 3.—The combs are entirely immersed in the alcohol-formalin solution in the spliced cans, but in the unspliced cans one end of the combs is immersed at a time as shown at the right.

Preparing Rim for Splicing on Crimping Machine.

There is another way that perhaps most tinners would prefer. The procedure is exactly the same as that already outlined

up to the time of cutting the slit in the four corners of the half rim; but instead of doing this the ordinary tinner can take the half rim and put it into a crimping-machine and crimp the sharp edge (not the folded edge) as shown in Figure 4. This will slightly reduce the dimensions so that the rim will neatly telescope inside of the can out of which the top has

Fig. 4.—The tinner will probably prefer crimping the edges on a crimping machine when splicing honey cans.

been cut. Before soldering, see that the rim is placed on square. It should not project down more than a quarter of an inch all around. In order to make a good job of soldering, cut a piece of wood ⅞ by 3, and just long enough to slip inside of the can, and bulge the spliced sides together. Then solder down four points on each side. With acid, solder and a soldering iron, it is easy to solder along each of the four sides by shifting the wood block to bulge the sides together. Any tinsmith can do this and make up about three cans an hour. I know this can be done, because our tinner tried it, and in the first hour he had three finished cans like those shown in the back rows in Figure 3. On the basis of a dollar an hour an average tinner could turn out the cans for 33⅓ cents apiece. My belief is, however, that if a beekeeper would take, say, 15 second-hand cans to a tinner the cost of splicing the ten cans would not exceed $2.50; or, in other words, the tinner ought to be able to lengthen out second-hand tin cans for 25 cents apiece, and make good money at it.

I should explain, perhaps, that the crimping machine is the same as that used for crimping one end of a stovepipe. The object is to reduce the diameter slightly so that one of the pipes will slip into the other. The same principle applies exactly in fitting the two parts of the square can together.

But suppose the beekeeper is a comb-honey producer and does not have any second-hand cans. There are two things he can do. One is to go to a neighbor beekeeper who buys extracted honey to sell again and get him to give him 10 or 15 cans or as many as he needs; and if he will not give them for the sake of cleaning his territory, he can sell them for a small sum.

The foreman of our apiaries, Jack Deyell, who has been using the expensive apparatus shown in the February Gleanings, pages 88 and 89, says that he believes he can do the work of sterilizing combs almost as rapidly, if not quite so, with 10 square cans spliced out the full depth of a comb, like those shown in Figure 3, and as efficiently and economically as the apparatus that costs 25 times as much. One of these containers has the advantage that, after a set of combs has been soaked for 48 hours, can and all may be moved right up to the extractor. The combs can then be lifted out and put in the machine direct and extracted clean of the solution when they can be put into the supers to be aired out. The solution can be put back in the same can from the extractor.

Other Uses for Second-hand Cans.

These spliced-out square cans will be handy, not only for the Hutzelman solution but for soaking the combs in the first place in water before the solution is applied. They would be handy in any extracting-house as simple honey containers; and almost every beekeeper can afford to have 10 or 20 of them on hand.

A quantity of them can be carried to an outyard, and the Hutzelman solution applied during the winter. The alcohol-formalin solution will not freeze; and during the cold parts of the year when the beekeeper will have plenty of time he can sterilize all his combs that are out of the hives, just as we are doing at Medina.

In most cases it would be a good idea to have the extractors sterilized with the Hutzelman solution after every season of extracting. Boiling water splashed into the extractor can not do it, because the water will cool just the moment it strikes the metal work or the sides of the can. After an extractor has been used for extracting out the Hutzelman solution from several hundred combs, one may be sure after that his machine will not carry disease to combs free from disease.

SOLVING THE MYSTERIES OF POLLEN

By Dr. E. F. Phillips

Wonderful Growth of Bee Larvae Attributed to Peculiar Properties of Pollen in the Food

[In most localities suitable for beekeeping, pollen is usually available in such abundance as food for the bees that it is taken for granted, thus causing beekeepers to miss the thrills that come from an understanding of the many interesting things connected with it. This is the second of two articles by Dr. Phillips on this subject, the first having been published in the March issue. These papers, read in part at the Wisconsin Beekeepers' Chautauqua last August, explain many of the mysteries connected with pollen and its use by the honeybee.—Editor.]

One of the most interesting subjects regarding pollen is the chemical composition of the entire grain, since it serves as food for bees. Von Planta, whose work on chemical lines has proved so valuable for beekeeping in several fields, made analyses of hazel pollen in 1884, and other chemists with an interest for beekeeping have done similar work. The discovery by Blackley in 1873, that hay fever is caused by the action of certain pollen grains on the tissues of susceptible persons, has greatly increased the interest in the composition of this material. Certain botanists have also made analyses because of the bearing of the composition of pollen on problems connected with the fertilization of plants. There is, for these several reasons, a considerable literature on the chemical composition of pollen. A typical analysis may be taken from a paper by Heyl, who finds the following percentages of some of the constituents of pollen of ragweed:

Moisture	5.28%	
Starch	0.00	(indigestible if present).
Crude fiber..	12.20	(indigestible to bees).
Pentosans ...	7.26	(indigestible to bees).
Protein	24.40	
Ash	5.39	
Dextrin	2.10	(indigestible to bees).
Fat	10.80	(of doubtful value to bees)
Sucrose	0.40	
Glucose	1.60	
Resin	17.40	(indigestible to bees).

While the simple carbohydrates in pollen may be useful as food for either adult bees or larvae, pollen is especially necessary as a source of protein material for the growth of the larvae during the period of heavy feeding. For this reason beekeepers are interested in the per cent of this material. Protein is also the factor in pollen which causes hay fever, and for this reason is of interest to medical men. Von Planta found 24.60% of protein in hazel pollen, Stift found about 16% in sugar beet pollen, and a sample of mixed pollen collected in the apiary of the Bureau of Entomology in 1919 gave 20.54%. Miss Koessler found 11.37% in ragweed, Kammann found 40% in rye pollen, Gillette reports 19.598% in corn pollen, while Miss Ruth Phillips reported the astonishing amount of 64.40% in an analysis which she made several years ago and reported privately to the writer. There is evidently great variation not only in the percentage of this constituent in different pollens but perhaps also in the character of the proteins contained in pollen. Some interesting work on the pollen proteins has been done.

Feeding Bees Substitutes for Pollen.

These protein analyses are also of interest because of the efforts which various beekeepers have made to supply their bees with substitutes for pollen, they usually attempting to furnish a material which has a high protein content, such as pea or rye flour. There are in beekeeping literature few records of such substitutes actually serving for food in brood-rearing, although years ago A. I. Root carefully reported one case, which is proof that such substitutes were actually serviceable for the purpose. When bees are fed these substitutes they also usually have supplies of natural pollen to some degree, so that one is unable to determine to what extent the substitutes were beneficial. Much such substitute material is thrown out by the bees after storage. Since all forms of protein are probably not available to bees as food, it appears quite likely that in many cases the pollen substitutes are actually valueless, and without far more careful work on this subject, both with the physiology of bees and from the chemical standpoint, there is little reason to look on pollen substitutes as helpful.

That the collection of pollen on the part of the bees is purely instinctive is shown by the fact that they often do not distinguish between pollen and other materials which resemble it superficially. Mention has already been made of the fact that they are reported at times to gather spores of lower plants, but it is not known to what degree they are able to utilize such material as food. Many years ago the great beekeeper Dzierzon reported that his bees were gathering rye flour at a mill, and concluded that they used this as food for their brood. On the basis of this and similar observations, he and others advised the giving of protein containing flours and meals to bees at periods when pollens are especially needed but when they are scarce. That bees will collect and carry to the hive such materials is well known; but, for an animal which is purely instinctive in its be-

havior, this is not at all evidence that the material gathered is useful in the colony economy. In a similar way bees collect sawdust and they have even been known to collect coal dust. One can scarcely imagine any use for such materials as these, and can conclude only that the instincts of the bees have in these cases led them into a curious blunder. We can scarcely assume that bees are sufficiently skilled in chemistry to determine what powdery substances will be useful to them, when man himself makes so many blunders regarding his own food. One dares not conclude from such observations that the bees find all the materials which they collect useful to them, and that therefore such materials should be given them in times of shortage.

An interesting component of some pollens is starch. In the beekeeping literature it is often stated that bees are able to digest starch, although the published evidence on this point is subject to severe criticism, and certain experiments performed by the writer and so far not reported in detail seem to show that bees are quite unable to digest or to utilize this material. Bees probably get starch very seldom in nature except in pollen. Dr. A. P. Sturtevant has reported an interesting case in which small starch grains from corn pollen might be mistaken by an inexperienced observer for the spores of *Nosema apis*, so that the starch grains in some pollens are of interest from several angles. Grass pollens often contain minute starch grains in considerable amount.

The starch content of those pollens which contain it apparently varies with the climatic conditions under which the pollen comes to maturity, and some species which have been at first found free of starch were later found with considerable amounts of starch in far northern latitudes. The formation of this complex carbohydrate in the form of minute starch grains within the pollen grain is apparently facilitated by the same conditions which bring about abundant secretion of nectar, containing another form of carbohydrates. There is also a difference in starch content according to the degree of maturity of the grain. Some pollens growing even under tropical conditions are found to contain some starch.

Pollen Produces Chemical Change in Sugar.

Pollen is not mere lifeless dust but is an active living material. In addition to the constituents which can be determined by chemical analyses of the usual kind, other interesting substances have been detected by a bio-chemical study of pollen. In 1886 van Tieghem, the celebrated French plant physiologist, found that if pollen is placed in a solution of cane sugar, the sugar is inverted to form the two sugars found in honey, namely, levulose and dextrose. This chemical change may be brought about in the laboratory by boiling the solution of cane sugar in the presence of acid, but this is not the method employed either by the bees in ripening honey or by the pollen grain. The natural means for this inversion, which is so commonly observed in nature, is by the action of a mysterious substance known as an enzyme.

The particular enzyme which changes cane sugar into the two sugars, known together as invert sugar, is called invertase. It has no action on other sugars of the same complexity as cane sugar or on starch or dextrine, and is therefore called a specific enzyme. Mr. Demuth and the author accidentally made the same discovery many years later in a peculiar manner. We made up a soft candy for one of our wintering experiments to which we added 6% of pollen removed after storage by a colony of bees. The sugar used was uninverted cane sugar, without the addition of honey or other materials. After the pollen was thoroughly mixed with the soft candy, the candy was placed over a colony and when it was warmed by the heat of the colony, the enzyme in the pollen began action on the cane sugar and liquefied it so that the candy ran down all over the bees, spoiling the experiment. Many other investigators have shown the presence of invertase in pollen.

Influence of Pollen Upon Digestion.

An interesting piece of work in this field is that of Miss Paton, the work being done at the Yale University Physiological Laboratory and published in 1921. She carefully examined 18 pollens and in these detected the presence of 13 different enzymes, not all of them being in all the pollens. Certain pollen grains are found to be able to break up starch into simple sugars, to separate maltose into its simpler constituents and to attack many other carbohydrates which would be unavailable as food to the plant without this action. Enzymes which attack fat and protein are also detected by physiological means. This work is of interest in physiological work on bees, since the alimentary tract is so full of pollen containing these various enzymes. There is reason to think that some of the work on the digestion of the bees has been rendered useless by the fact that the observers did not recognize the presence of enzymes in pollen and attributed those found in the alimentary canal solely to the production of the bees themselves. The best paper on bee digestion which

has yet appeared has been reduced in value by this very error.

In spite of the presence of enzymes in pollen which break up fat into simpler available compounds, the bee apparently does not utilize the fat in pollen or at least not all of it. If one examines the alimentary tract, pollen hulls that appear empty are found in great abundance in the rectal ampulla during the brood-rearing season. If this mass of material is stained with Sudan III, which stains fat globules red, it is often noted that the apparently empty pollen hull contains in its center a minute fat globule which has not been removed by digestion. The digestion of fat is assumed as possible in most discussions of bee digestion, but it appears that more work in this field is needed badly.

Pollen, a Remarkable Food.

Recently attention has been directed to certain other mysterious compounds occurring in foodstuffs which are essential to growth processes, the vitamines. So far, no investigations have been made on pollens to determine to what degree they contain these substances. When we consider the fact that the bee larva, using a food derived largely from pollens, is able to increase in weight over 700% in twenty-four hours, and to increase in weight 1550 times in slightly over five days, one must conclude that pollen is a prolific source of the vitamines. From whatever source a food is derived, these vitamines are believed to have their origin in plants, so that one can scarcely conclude that the nurse bees themselves generate the vitamines needed for larval growth. The carbohydrates used for the manufacture of larval food, honey or sugar, can not be considered as a sufficient source of vitamines, if they contain any at all, and the only probable source would seem to be the pollens. The rapidity of growth which occurs from the use of pollens as food suggests the desirability of investigations of the vitamine content of pollen, since it would seem probable that here there is a wonderful source, easily available for investigation and perhaps for use. Perhaps a little pollen before each meal would be better for human use than some of the compounds widely advertised for their vitamine content, some of which are in fact almost free of these substances.

How Cross-Pollination is Brought About.

The problem of self-fertility and self-sterility of different species of plants has attracted a great deal of attention, especially on the part of those interested in horticulture. The beekeeper is vitally interested in this work, since for those species or varieties known to be self-sterile, the honeybee comes in as perhaps the most efficient agent for bringing about cross-pollination, which is necessary for the setting of seed in such instances, and consequently for the formation of the fruits. This is not the occasion for a discussion of the numerous factors involved in self- and cross-fertility, but there is an interesting fact in pollen physiology which is necessary to a complete understanding of the problem in some instances.

It has been found that, in some plants if the pollen grain falls on the stigma of the same flower, it is inhibited in its growth and either does not germinate, or germinates only slowly. If a pollen grain from another plant of the same species is placed on a stigma at the same time that a pollen grain from the same flower is put into place, the tube from the foreign pollen grain grows with much greater rapidity and is, therefore, the one which first reaches the ovule. In some cases pollen from the same flower does not germinate at all, and the rate of growth doubtless varies greatly in different partially or completely self-sterile species. Many varieties of the common deciduous fruits are self-sterile, and others while self-sterile produce less valuable fruit when self-fertilized.

Life of Pollen Exceedingly Short.

The beekeeper sees pollen carried to the hive, stored there and used as food for bees perhaps many months later. It is not, however, true that pollen grains live indefinitely, and in many cases the life of pollen is exceedingly short. It is sometimes desirable in pollination experiments to hold over the pollen of a variety blooming in early summer to apply it to a variety blooming later, and in such experiments it has been found that the life of pollen is often exceedingly short. Other cases are recorded of pollen being kept for several months, still viable. The Arabs are reported to keep date palm pollen for 15 years with good results, and sugar cane pollen has been kept for some time. In an effort to obtain citrus pollen from Japan for use in Florida some years ago, the utmost care in shipping was necessary, and the temperature and humidity were regulated in order that it might reach its destination alive. Some apple pollen has been found to live for 11 days, while other pollens live for only a few hours after leaving the plant. Whether the addition of honey to pollen, as when stored by the bees in the cells of the comb, has any influence on its viability has not been investigated.

Apparently there is no loss in the food value of pollen when stored by bees, at least for a considerable time after storage, but this is not evidence that the

pollen is still alive. Sometimes old pollen in combs becomes dry and dusty and is removed by the bees. Stored frames of pollen often show this drying-out more than do combs left with the bees. Probably this change in the character of the pollen stored away from the bees is usually caused by a mite which lives on and breeds in the pollen.

Pollen and Hay Fever.

A discussion would be incomplete without further mention of the action of certain pollens in causing the distressing disease, hay fever, from which many thousands flee as from a plague each summer. Since the earliest work of Blackley, an English physician, in 1873, many investigators have attacked this problem, until now the pollens of a considerable list of plant species are determined as the causes of this disease. Not all susceptible persons are susceptible to all the pollens which are known to cause the disease, they usually being fortunate enough to respond to only one or a few pollens. This would indeed be a distressing disease if all hay fever sufferers were affected by all these pollens, for their period of blooming is from early spring until late frost. The evidence is that it is the protein constituents of the pollen which cause this irritation.

A wide variety of plant species are listed for the various parts of the United States as causes of this malady, and one person may have the disease in one locality and be free from it in another, although the second location contains plants which there cause other individuals to experience this extreme discomfort. The pollens causing this distress are not solely those usually catalogued as being carried by the wind, since, for example, the dandelion, clover and fruit tree pollens are found to be causes of this condition in some people. Work in this field is being carried on by many medical investigators, and there is hope that they will conquer this disease.

Use of Pollen in Brood-rearing.

To return once more to the function of pollen in beekeeping, we know that during brood-rearing the workers consume great quantities in order that they may elaborate the larval food. That the food given the young larvae is a secretion can no longer be questioned from whatever angle one attacks the problem. The bees evidently digest and assimilate the protein material of the pollen and then secrete it through glands opening near the mouth. It is also known that at later stages in the development of the larva, the worker nurses give a food containing undigested pollen grains and honey, so that the larva itself must do the digesting of the protein material to enable it to continue at the astonishing rate of development, with which all beekeepers are familiar. The quantities of pollen used by a bee colony during brood-rearing are enormous. The examination of the alimentary tract of nursing bees shows great masses of pollen in the alimentary tract, thousands of full grains in the ventriculus and both full and empty grains in the rectal ampulla.

One might guess that when the workers digest and assimilate pollen during this time that they use for their own bodies some of the protein thus incorporated in their systems, but how much they thus use for themselves is unknown. That adult worker bees are capable of living for months without pollen, and thus with little or no newly ingested protein food is evident from the many experiments of beekeepers in wintering bees on combs free of pollen. At one time Heddon, supported by Cook, evolved the theory that pollen as winter food is the cause of dysentery, and those beekeepers who accepted this erroneous theory tried to remove all pollen from the combs before the bees went into winter quarters. No difficulty in wintering without pollen was recorded.

While pollen is practically the only source of protein in the food of bees, their ability to live for months without this food is not proof that they do not utilize protein during this period. Some recent work by Fraulein Koehler at the Bern Station indicates that they have a store of protein in the fat body on which they draw during winter. The name "fat body" is unfortunate both for the brood and adult stages, since other materials than fat are there stored, both glycogen and protein materials being detectable in these organs in all stages, not only in honeybees but in other insects.

The facts mentioned may not gretaly increase the honey crop, but they surely add greatly to the interest which the beekeeper must have in the things which he sees daily about him as he works with his bees, and any such information is worth while. We are exceptionally fortunate in beekeeping that the subjects allied to ours are so replete with interest, and many of the facts which are already known are so interesting as to cause a thrill to the interested beekeeper. Then, too, one never knows when some of these facts of apparently no practical worth may turn up as quite vital to our welfare and to that of our bees. We can not deliberately overlook any of these fields, and of all the interesting substances with which the beekeeper and the bees deal, there is none of more interest than pollen.

Washington, D. C.

LEARNING AND UNLEARNING

By Leslie Burr

Making Rapid Increase in the Tropics Previous to the Honey Flow

[In certain localities in the South, increase can be made this month and the divided colonies built up in time for the main honey flow because the main honey flow occurs relatively late. In the North making increase should not be attempted until May or June, and even then, as a rule, no crop is expected from the divided colonies the same season. The exceptions to this are in localities where the main honey flow comes relatively late, as in the buckwheat region. For this reason many northern beekeepers make increase in July or August after the crop has been secured. Owing to the great variation in the time for making increase, this article is published at this time so that beekeepers throughout the Northern Hemisphere may benefit from it.—Editor.]

In the days immediately following the Cuban Revolution or, as the Cubans called it, the "War of Independence," which may virtually be said to have ended with the Battle of San Juan Hill, beehives in Cuba were few and far apart. For during the years of the war with Spain the Cuban insurrectos had,to a large extent, lived off the country, with the result that on the morning when the United States ship of war Maine was blown up in the harbor of Havana, the country districts of the island were in a rather depleted condition. To make things worse, those things that the insurrectos could not make use of, which included the apiaries, they destroyed so as to keep them out of the hands of the Spanish. The farm lands were uncultivated and the fields grown up to the bellflower and other plants. Blossoms, blossoms everywhere and scarce a bee to gather the honey! So with the advent of peace and the American beekeeper in Cuba the first problem was the matter of making increase.

Making Increase Becomes a Fine Art.

Now in my experience with bees previously to my arrival in Cuba, increase had been a matter that had largely taken care of itself. A few divisions and natural swarmings replaced the winter loss and made all the increase of colonies desired. But with the progressive beekeepers in Cuba, increase by reason of its importance at the time had become a fine art; and I well remember the expression on the face of Glen E. Moe when he asked me what I thought of the Summerford method of increase, and I had to admit that I was ignorant of even the existence of any such method. Had I confessed total ignorance of Washington or Lincoln, it would have been no worse a confession. But I soon found out what the Summerford method is. Incidently, I will say that this particular method had been the one most used in western Cuba and under the conditions that existed there at the time it was probably the best.

Claude Hill (I think he now lives at Chagrin Falls, Ohio), who spent several years in Cuba during the early days, once told me that, on one occasion following the Summerford method, he made two big, strong colonies into twenty. As I now recall it, Hill said that the two colonies were divided on the 4th of July, 1902, and by October 1 of the same year, each colony had built a set of extracting combs and was in fine condition ready for the honey flow.

Simple Method for Making Rapid Increase.

The Summerford method is simplicity itself. The queen is removed from a big, strong colony and then, 10 days later, the colony is divided. Two frames of brood with bees and a queen-cell or cells are placed in a hive together with a frame of honey, the two frames of brood being placed at one side of the hive and the frame of honey placed next to them, thereby acting as a division-board as well as furnishing stores. The entrance of the hive is then stuffed tightly with green grass, and the hive placed where desired. In fine days, if the bees have not cleared a passage through the grass, some of it should be removed, so that the bees have a passageway. Two weeks from the date the divisions were made, if everything has gone right, each division should be be a husky contented little colony with a laying queen. In fact, so well does the method work that one enthusiastic beekeeper, after trying out the Summerford method, wrote an article to Gleanings in which he proclaimed (it was during the days when President Roosevelt was in the limelight) that he would "rather be Summerford than President."

Incidently, and for the benefit of any person that may decide, on the strength of what I have just written, to try out the Summerford method of increase, I want to say that it is well to follow religiously the exact procedure as described by Summerford. I make this statement by reason of the fact that a few years ago I advised a young beekeeper here in California to make, by the Summerford method, some increase he desired. Three years later I saw the young man again and to my surprise he began to tell that the method of making nuclei that I had advised him to follow was a failure, because he had done exactly as I told him, and had lost every nucleus. He was very positive that it was through no error nor

fault of his that the bees had died. Just where the trouble was I do not know to this day, although I think that the hives were not tight, and that during the first three or four days the bees escaped either by reason of the grass having not been tightly placed in the entrance or the hive covers were not bee-tight.

The great advantage of the Summerford method of increase is that there is so little work connected with it; there is little danger of chilled brood, and good queens are produced. For the average beekeeper who is not a good queen-breeder, it is, in my opinion, the best method of making increase, that is, when there is three months' time for the increase so made to build up for the honey flow or for winter as the case may be.

Increasing 50 Colonies to 300 in a Single Season.

Another method of making increase I practiced during the summer of 1905. It was on the old Osborne range at Casanovia. Osborne was the first practical beekeeper in Cuba, and had the first modern frame hives there just previous to 1905. The bees had been lost as a result of foul brood, and there were less than fifty colonies which had been worked for comb honey, when I took hold of them April 1, 1905. On October 1, 1905, six months later I had increased those bees to an even 300 colonies, with an average of five super combs to the colony. The hives were the ten-frame size, and I used no foundation. Royal palms were plentiful and had yielded sufficiently all summer for the bees to breed freely.

The method I followed was to go over the bees on an average of once each week. From each colony I took whatever brood they had in excess of six frames, being careful at all times to take frames having as little unsealed brood as possible. Whatever bees adhered to the combs were allowed to remain. Such combs of brood were placed in a hive on the wheelbarrow, until five frames of brood had been secured. The hive was then placed in the position it was to occupy; a frame of honey was added as a follower or division-board and for stores; a ripe cell was given; the entrance was stuffed with grass to prevent the escape of bees, and the deed was done. Along about August 1 I had 300 such six-frame colonies, and from that time on no more increase was made. Brood-spreading was practiced at all times, care being taken to place the empty frame between combs of unsealed larvae as bees will build comb much more readily there than elsewhere.

In this instance, the reason I did not use foundation was because I did not have it at hand. I will further state that on October 1 while I had practically no drone-comb in the brood-chamber, having worked it all above; as a result practically all the super combs were drone.

As to queen-cells, I produced them by the Doolittle method, and when working the bees I carried the ripe cells wrapped up in a handkerchief placed in the crown of my hat. In fact, I have found that for me the hat is the most satisfactory place to carry queen-cells, especially when no veil is worn.

It may be well to add that for a good many years I have followed no cut and dried method of making increase. In Hawaii I made my increase after the algarroba honey flow, which ended about July 1 with me. I preferred increase to honeydew, and followed the Summerford method. Prior to living in Hawaii I resided at San Diego, California, and there had a few colonies of bees on the roof of the house where I lived. Each year I tripled the number of colonies I had on January 1 and averaged 200 pounds or more per colony, January count, the method used being the Casanovia plan, with the modification that each colony when made consisted of seven frames of brood whenever possible. Such colonies were ready to begin work almost as soon as they had laying queens.

SHIPPING COMBLESS PACKAGES

By M. J. Deyell
Foreman of The A. I. Root Co. Apiaries

A Summary of the Methods Used by the Most Successful Shippers of Package Bees

When we become satisfied with our present attainments it is an indication that we are non-progressive; we are in a rut; or we are beginning to age mentally. The individual who is always looking for new ideas, new ways of doing things and greater attainments is the one who is getting ahead. One must be careful, however, in adopting new ideas to be guided by good judgment, which, in the final analysis, is nothing more nor less than good common sense. Well, what has all this to do with the how of the shipping combless package of bees? We shall try to find out.

The package-bee business in a commercial way has developed practically within the last 10 years. In looking through the advertising columns of Gleanings in

Bee Culture and the American Bee Journal prior to 1913 I find few, if any, advertisements of package bees for sale. The packages offered at that time were nearly all one-half pound and pound sizes. There are four main reasons for the existence of the package-bee business, namely: 1. A means of replacing winter losses of bees in the North. 2. A means of strengthening weak colonies in the spring. 3. A means of starting new apiaries at a minimum of cost. 4. A means of getting away from the possibility of purchasing American foul brood.

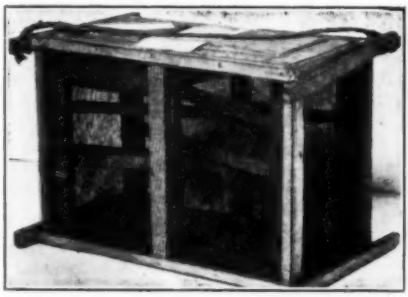


Fig. 1.—Cage suitable for either parcel post or express since it has double screens. It has the candy box above, slats for clustering and projecting strips to prevent suffocation.

In order to assemble the ideas of many shippers a questionnaire was sent to a number of the leading shippers of bees and queens in the United States which read as follows:

1. Do you use bee candy or sugar syrup as food for bees en route?
2. If bee candy is used, is it made of honey or invert sugar syrup?
3. If sugar syrup is used, do you add tartaric acid or some other ingredient to prevent granulation?
4. How much syrup or candy do you allow the sized package you ship for a five or seven day journey?
5. When shipping queens with packages, do you cage the queens, safe in the packages, cage the queens to be released en route, or ship the queens already introduced to packages?
6. When caging queens in packages, do you include attendant bees with queens or have queens alone in introducing cages?
7. Do you shake your bees morning, noon or night?
8. If there is a honey flow on, do you shake your packages early in the morning before bees get out for nectar?
9. How close do you shake a colony, or in other words, how many combs of bees do you calculate to leave in each colony that is shaken, not taking into account the field bees?
10. In case there is a dearth of nectar at the time the bees are shipped, do you give the bees a feed of sugar syrup through the screens of the shipping cages?
11. Do you ship by express or parcel post?

The majority of the shippers were glad and willing to give the information and expressed their willingness to co-operate further in any way possible in arriving at the truth of this matter. Twelve responded by filling out the questionnaires, and seven sent a sample of the shipping cages they use.

How the Questions Were Answered.

Six of the twelve shippers use sugar syrup as food for bees en route, and six use bee candy. It is significant to note that the western shippers, two in California, one in Arizona, two in Texas and one in Mississippi use sugar syrup, while the remaining six, who are located in Alabama, Georgia and Mississippi, use bee candy. This would indicate that sugar syrup must be better for shipping bees throughout the West over the arid parts of the United States. The shippers in the East claim to have satisfactory results from candy. This may be due to the difference in temperature and humidity between the West and the East.

All of the shippers who use candy in their packages make this candy from honey and pulverized sugar. Unless the shipper who uses bee candy is absolutely certain that the honey from which the

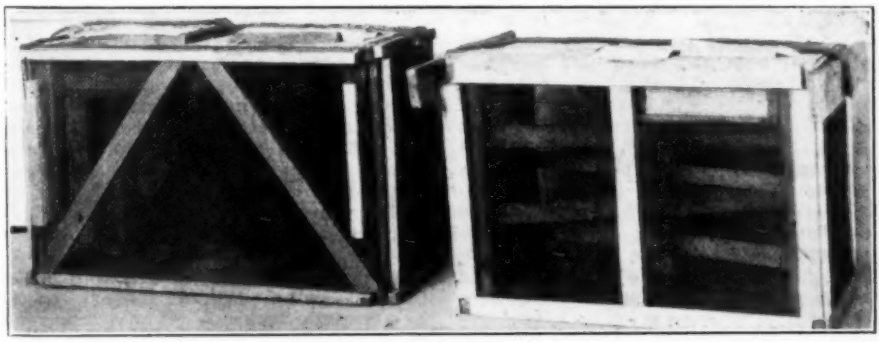


Fig. 2.—Left: A substantial cage with candy-box feeder above and wire cloth arranged below for clustering instead of wooden slats. This cage is also double screened for parcel-post shipment. Right: A sturdy cage with candy feeder above, wood cross-pieces for clustering and wood projections to prevent piling too close.

candy is made is free from disease, or in other words, that there is no American foul brood in the vicinity where the honey is produced, this is a dangerous practice. It is possible of course to boil the honey in a closed vessel for 20 or 30 minutes, but those who know anything about candy-making realize that this procedure spoils the candy. Here at Medina we use a bee candy made of invert sugar syrup and pulverized sugar in all queen mailing cages and bee-shipping cages. It is only within the last three years that we learned how to make this candy successfully.

Only one of the six shippers using sugar syrup uses tartaric acid or some such agent to prevent granulation. The advisability of using acid in syrup would depend on the thickness of syrup and the temperature during shipping. Thick syrup and cold weather would make acid more necessary.

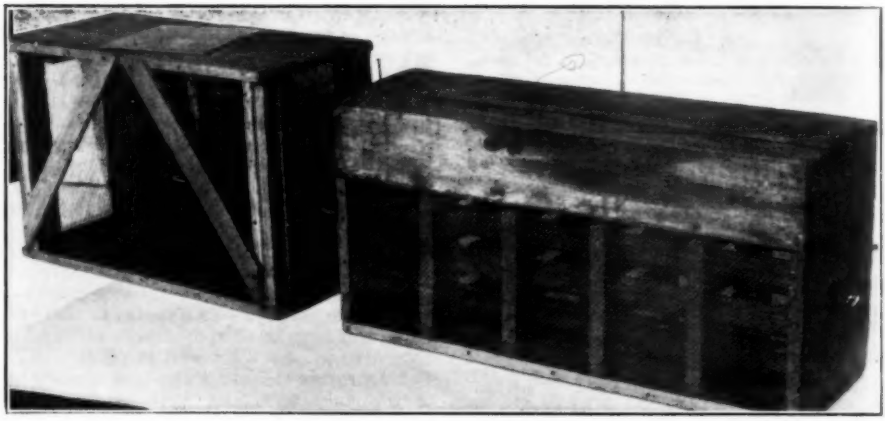


Fig. 3.—Left: This cage has a one-quart can feeder for syrup and wire cloth arranged below the feeder for clustering. It is open at ends and sides. Right: This cage has two pint-can feeders for syrup and a rack for clustering, which is easily removed with adhering bees when placing them in a beehive.

The majority of shippers use from 2½ to 3 pounds of sugar syrup for two pounds of bees, and one pound of candy for two pounds of bees. This seems reasonable.

Ten of the shippers cage the queens safe within the packages, one cages them in the packages to be released en route, and one when shipping in quantity lots ties the cages containing the queens on the outside of the shipping cages. Our experience along this line leads us to believe that the method of caging queens safe in packages is preferable to the others.

All of the shippers include attendant bees with the queens in the mailing and introducing cages. So do we.

The replies to question No. 7 were indeed varied. Most of the shippers say that they fill packages when it is most convenient. Early in the morning seems to be the time preferred for shaking bees by the majority of shippers. Conditions in different localities vary so much that it would be difficult to make any hard and fast rule along this line.

Question No. 8 also was answered in a variety of ways. In some localities the honey flow starts early in the morning, and thus it would be practically impossible to beat the bees to it. The consensus of opinion, however, seems to be that it would be preferable to do the shaking early in the morning before the bees get started to work. Our experience has been that, if we attempt shaking bees during a heavy honey flow, they get smeared up with the thin nectar, and this usually results in unsatisfactory shipping. This seems to be especially true when the weather is unusually hot.

Question No. 9 also brought a variety of answers. The majority advise leaving three to five frames of bees in each colony after shaking, the amount depending on the time of the year and the number of bees in the field. A goodly percentage of shippers favor shaking not more than two pounds of bees from each colony at one time, unless the colonies are unusually strong and likely to swarm.

The general opinion seems to be that more bees can be obtained from colonies by shaking rather sparingly than by shaking heavily at one time. One shipper in California states that during one season he shipped 28 pounds of bees from one colony. This past season we had a small apiary of about 30 colonies about 2½ miles from Medina, which we used for package bees. We shook an average of over five pounds of bees from each col-

ony during the season. Conditions were favorable for the colonies building up to normal strength during the fall, and they went into winter quarters in good condition. A number of our colonies have had eight or ten pounds of bees taken from each of them during the past season. It might be possible in the South where the seasons are longer to take even more than 10 pounds from a colony in a single season but this is hardly probable, due to the fact that the majority of southern shippers do the bulk of their shipping during four to six weeks.

The 12 shippers were evenly divided in their opinions as to the necessity or advisability of feeding packages of bees sugar syrup through the screens of the shipping cages before they are put aboard the train. Six shippers favor and practice this method, while the remaining six do not practice it, but some say it may be advisable. In this connection it is interesting to note that four of the six shippers who use sugar syrup give their package bees a feed of syrup through the screens before they are put aboard the train. Only two of the six shippers who use candy make a practice of doing this. One shipper in Texas says that feeding bees all they will take through the screens of the cages before shipping is the secret of successful shipping. This shipper uses sugar syrup for bees en route as well.

There must be some virtue in supplying plenty of sugar syrup to bees shipped in packages. Quite a number of years ago, even prior to 1913, while we were experimenting with shipping bees in combless packages, we painted the screens of the shipping cages with sugar syrup until the bees had taken all they would, and this was all the feed that the bees got. Bees thus shipped, when not longer than two or three days en route, reached destination in good condition.

Replies to the last question show that four of the shippers send bees by express only, and the remaining eight ship by express and parcel post, but mostly by express. It is easy to understand why in some instances, where customers are not convenient to express offices, parcel post shipments of bees are desirable. At the present time we are inclined to favor shipping by express, because it is impossible for the shipper to get any consideration from the parcel post authorities in case of loss of bees en route. Furthermore, it is impossible to ship packages of bees containing liquid feed by parcel post.

We asked the shippers to send us samples of the cage they use. Seven complied with this request, and the remainder were unable to do so at the time. We find that the majority of the cages are designed for two-pound packages, and that they contain about 550 cubic inches of space. All but one of the cages received have screened sides, and some have screened ends as well. It will be noted from the illustrations that one shipper has the sides of his cage protected by thin boards, allowing about an inch of ventilating space between the boards and the screens. We rather favor this idea because in case a shipment is delayed at some transfer point, and left on an express truck where the rays of the sun beat directly on the sides of the cages, these boards protecting the screens would also protect the bees from the sun's rays. Of course the employees of express companies are not supposed to allow bees to

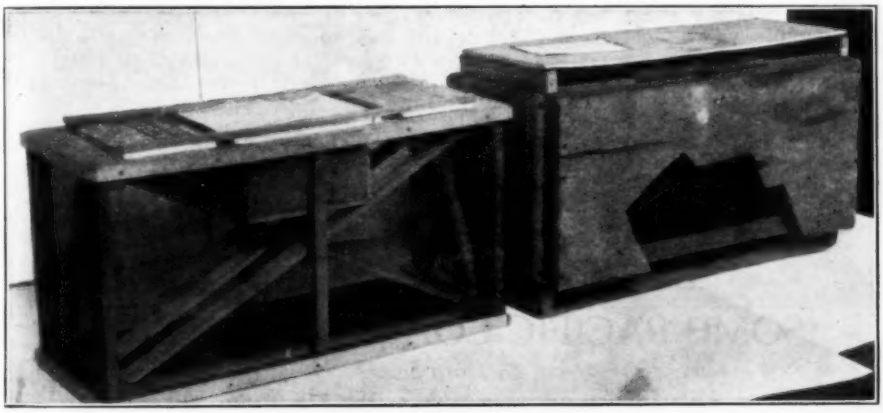


Fig. 4.—Left: A light but substantial cage with candy-box feeder above. The queen cage is slipped into a slot at the top and is easily removed for introducing. Right: This cage has a candy-feeder above. Note the side is partly cut away to show how the screen is protected. There is an air space between the protecting boards at sides, top and bottom.

be put in the sun, but some of them may need a little educating along this line.

It seems to me that success in shipping package bees depends on three things, namely, the bee-shipping cage, the kind and quantity of food for bees en route and the quantity and age of the bees shipped.

The Bee-shipping Cage.

A cage for shipping bees should be large enough to admit plenty of ventilation. It should be so constructed that as much light as possible may be kept out, thereby causing the bees to be quiet and contented. The cage should be of such shape and construction that the bees may be easily transferred into the hive on arrival.

The Kind and Quantity of Food for Package Bees.

As already stated, we use a bee candy made of invert sugar syrup and pulverized sugar as food for package bees en route. This seems to answer early in the season and up to the fore part of June when hot weather comes, but we have a considerable percentage of loss during hot weather. We have never tried sugar syrup for shipping package bees long enough to be convinced that it will solve the problem of loss in hot weather, but we are inclined to think that it will. Southern shippers do the bulk of their shipping from April 15 to June 1. The bees traveling from South to North or from hot to cool latitudes do not suffer as they would if shipped later in the season during June and July when in the northern states it is likely to be as hot as or perhaps hotter than in the southern states.

Inasmuch as the natural food of bees during confinement in hives is liquid honey, which is practically 20 per cent water, it seems reasonable to suppose that sugar syrup, which contains considerably more water than does honey, would be a better food for bees in confinement than bee candy which has a water content of only about 7 per cent. There is no question but that bees in confinement need water in hot weather.

Quantity and Age of Bees Shipped.

The consensus of opinion seems to be that the two-pound package is preferable, especially from the standpoint of success in shipping. Sometimes a three-pound package is more desirable from the standpoint of the purchaser. A package consisting mainly of young bees is undoubtedly preferable for three reasons, namely: 1. Young bees that have not yet reached the flying age would naturally be more contented in a shipping cage than would older bees of the honey-gathering age, that prior to being placed in the shipping cage had been accustomed to leaving the hive at will. 2. The younger bees have more vitality to withstand the strain of a strenuous journey. 3. Young bees are worth much more to the purchaser than are old worn-out bees.

Medina, Ohio.

SOME PACIFIC COAST BEEKEEPERS

By Dora Stuart

A Retired Business Man Takes up Beekeeping and Tries Out Business Methods in the Industry

Carey W. Hartman, having retired from active business life, found himself as he expressed it, "embarrassed by laziness." He had nothing to do but watch for the postman from the window of an apartment house in Oakland, California, and ponder on some method of "taking up a little more time."

After years of outdoor life dating from a boyhood spent with bees and flowers, and manhood spent among Indian tribes in their native haunts and on the lecture platform telling about them, it was inevitable that in his extremity he should obey the proverb, "Go to the bee, thou sluggard; consider her ways and be wise!"

As a time-consumer the few colonies of bees collected together on a vacant lot were highly satisfactory to Mr. Hartman, while highly amusing to his immediate family, who shared the general suspicion that beekeepers, like sheep and goat herders are, to put it mildly, just a little "touched."

Blissfully unconscious of opinion both public and private, Mr. Hartman began to seek others of his kind, but everyone he approached said, "There are no bees in Alameda County."

"It's a funny county that doesn't have bees," he reasoned, "when, in the East, California is noted for its honey. Perhaps bees exist in spots as do California climate and soil." He laid the case before the Farm Bureau, but these officials, too, were unable to cope with the situation.

How a County Association Was Born.

It was the colonies themselves that finally accomplished his object. Chief among the bee affinities they attracted to the vacant lot loomed Ralph B. Calkins, who gladly joined Mr. Hartman in his quest, the two finding such mutual

comfort in their combined ignorance concerning bees, that they conceived the idea of holding a meeting to share their discoveries with whoever would accept their invitation, "Come, let us reason together"

The meeting was widely advertised for Friday, April 4, 1918, at Hotel Oakland, the program consisting of two numbers: George A. Coleman of the University of California was to tell all he knew about "Swarming"; he was to be followed by B. D. Marx Greene who was to subject "Bee Inspection" to the same acid test.

The net results were an organization of the Alameda County beekeepers, and their first realization of foul brood as a menace to their county, consequently the urgent need of an inspector. Mr. Hartman was elected president of the new as-

Cary W. Hartman.

sociation, but whatever pride he may have felt at the honor was somewhat shaken the next morning when his irrepressible son inquired:

"How did the meeting go last night, Pop?"

"Fine! we organized an association."

"What's the name of it?"

"Pop" hesitated. "It's the Alameda County Beekeepers' Association."

"The name's all wrong, Pop."

"Why, what would you have called it, Son?" "Pop's" tone was conciliatory and a little anxious. From the first he had felt misgivings over the length of their title.

"I'd call it 'Benevolent Order of Beekeepers'," glibly responded the boy.

"Pop" didn't see the point and said so.

"Well, you see," explained the boy, "the initials would stand for what you are, a lot of boobs."

Association of "White Collar" Beekeepers.

Chastened in spirit but unswerving, "Pop" continued to meet with his fellow "Boobs." There were lawyer Boobs, preacher Boobs, Banker Boobs, University Regent Boobs, in fact, Boobs from all walks of life, all keeping bees as a hobby and driving in Pierce-Arrows and the like to the meetings at the Hotel Oakland, now their permanent home. There was a noticeable dearth of shirtsleeve beekeepers, no doubt because of the very few commercial apiaries in the Bay district, or possibly because the shirtsleeve variety may have entertained doubts concerning hotel beekeeping.

However that may be, the Boobs, all successful men of affairs, launched the bee association on the same plane. If their bees were subject to disease and needed attention, and under the law they

Two hundred colonies of bees with 100 empty hives on top. The truck is going into the star thistle location for the summer. Cary W. Hartman's hobby on wheels.

were entitled to inspection, then inspection they should and would have. The next question was, who would be "it?"

"Those who know about bees either can't afford the time to inspect 'em, or they won't tackle the job," Mr. Calkins pessimistically summed up the case, finally declaring that they would have to accept an inspector who "knew nothing about bees to begin with, and who cared nothing about money."

Mr. Hartman, always equal to the occasion, announced that the requirements fitted him, and proclaimed himself "it." He relates with much amusement the awe with which he and his committee approached and laid before the august body of county supervisors the petition of the beekeepers for the first bee inspector ever appointed in Alameda County.

Having quieted the question of compensation for such work, there appeared to be no further obstacle to the appointment of the candidate, other than to settle a moot question as to whether his

correct name was Miss Cora Hartman or Miss Carrie Hartman.

The foregoing historical facts may be found related more in detail in old copies of "Bees and Honey," the official organ of the Alameda County Beekeepers' Association.

The Tail Wags the Dog.

Previous to that time, conventions of the State Beekeepers' Association had been, as a matter of convenience, almost invariably held in southern California, preferably Los Angeles, as that city was the center of the most extensive honey-producing section of the state. A new precedent was set when the State Association was invited to convene in Oakland for their 1921 meeting.

The invitation was extended by the Alameda County Beekeepers, also by the Chamber of Commerce and the Mayor of Oakland. Upon its acceptance the

Out of a total of 15,000 beekeepers, 8,000 of whom are commercial, producing from 10 to 15 per cent of the entire honey crop of the United States, state conventions were attracting barely 100 beekeepers, and in place of representing California's forty odd counties, delegates from possibly a dozen counties only would be in attendance. As to new pastures, beekeepers were far too busy attempting to monopolize well-known pastures to go out in search of virgin fields.

Many factors have contributed to the success of Mr. Hartman's policies. Foremost, the late California Honey Producers' Co-operative Marketing Exchange, while considered a sad failure, has in reality done more to shatter provincialism among California beekeepers than any other one agency. Through it, beekeepers from all sections of the state became acquainted, experiences were swap-

A portion of Cary W. Hartman's 400-colony hobby in the star thistle location in Butte County, California.

"Boobs" got busy in earnest. Mr. Hartman was made chairman of the program committee; the city council donated $500 for the entertainment of guests; 30 automobiles were turned over by Oakland business men for the use of delegates on sightseeing trips around the Bay. During the convention, chambers of commerce in Berkeley, Oakland, Alameda and Haywards were visited, and in one town the ladies turned out with refreshments of cakes and coffee.

At that convention Mr. Hartman was unanimously elected president of the State Association, and he immediately began to apply boob methods on a statewide scale. First, state membership must be built up in numbers; second, its personnel must represent all counties where bees are kept; third, it must develop new territory for the expansion of the beekeeping industry in California.

What has been accomplished along these lines?

ped pertaining to the buying of supplies and handling bees, and many lasting friendships were formed. That alone would justify its meteoric career, and will in time return full value to the beekeepers for all their losses. Southern beekeepers began to follow the advice of John Duncan Bixby and migrate northward, with beneficial results to both sections. It preserved thousands of southern colonies from actual starvation, while stimulating northern beekeepers to more organized endeavor.

Published a Bee Journal to Give Away.

Then followed "Bees and Honey" invading every county in the state, searching out every bee organization, county inspectors where they existed and, if not, the most prominent beekeepers to act as distributing agencies to place free copies in the hands of individual beekeepers; and inviting beekeepers everywhere to speak through its columns. Unfortunately, Mr. Hartman through an enforced ab-

sence from California of several months' duration, was obliged to turn "Bees and Honey" over to Mr. York, who now ably edits that paper in Spokane, Washington. But Mr. Hartman did not turn over the convention to Mr. York or to any one else.

While preponderance of bees is an excellent and logical reason for taking the state convention to the southern part of the state, Mr. Hartman's theory is that the convention should go where the beekeepers want it, not only enough to ask for it, but to sponsor it and work for its success. The 1922 meeting was held at Visalia, a central California town. Sacramento County asked for the 1923 convention and secured it. It was held at Sacramento on December 27 to 29, inclusive. The spirit of the meeting was that of the slogan formerly adorning the front page of "Bees and Honey," "No North, no South, no East, no West—just California."

The counties represented cover an area of 130,000 square miles extending from within 50 miles of the northern boundary, to within 100 miles of its southern line, and the combined apiaries of the delegates numbered from 20,000 to 25,000 colonies.

An Era of Co-operation.

"Co-operation," the convention slogan, created an atmosphere of harmony, and illustrated still another of Mr. Hartman's favorite slogans, "You can't help yourself without helping the other fellow." Beekeepers pledged co-operation in selling honey; the University of California pledged co-operation in securing honest labels on honey through their Pure Food Department—that is, labels that describe truthfully the contents of their containers; and the Agricultural Department of the state pledged co-operation in the matter of securing legislation that will more nearly represent the aims of beekeepers. The co-operative efforts of these three essential factors will be invincible and statewide in their effect. Mr. Hartman was re-elected president, and the association pledged itself to secure 1000 members in 1924.

While Mr. Hartman was busily seeking to realize his ideals for California beekeeping, through original methods of idealizing his "reals," his bees were busy multiplying until even his son was obliged to admit that the "boob" had graduated to the commercial class of beekeepers. Mr. Hartman's apiary now numbers 400 colonies, and, although from lack of time he still does very little of the "shirtsleeve" work, he is sure it is not a losing investment. While he would not advise eastern beekeepers to fly to California on the strength of his experience, from conditions with which they are familiar to ills they know not of, still he maintains that for the amount invested no agricultural pursuit pays so well as beekeeping. But even now, he never permits anyone to trap him into admitting that he knows anything about bees.

When winter "flares back" in April the windbreak and the winter packing are especially valuable.

FROM THE FIELD OF EXPERIENCE

ADVANTAGES OF PACKAGE BEES

A Comparison of Profits from Colonies Wintered Over and Colonies Built up from Packages

For several years I have been carefully comparing results from wintered-over colonies and package bees. I have figured out some things for my location, and am experimenting to determine several others. There is no doubt that in many locations package bees will make a profitable increase for the beekeeper. Some remarkable yields have been recorded for single packages of bees, but it is the average for a whole apiary over a period of years that counts. The packages have stood this test with me for six seasons. The yield has varied from year to year just as with old colonies. Some seasons are better than others, and conclusions can not be made from one season's results.

One year I started a new apiary with 25 packages, each containing two pounds of bees and a young untested queen. Since no drawn combs were available all bees were put on full sheets of foundation. One quart of feed was given the first day, and another quart the second; this was all the feeding necessary because dandelions and fruit bloom supplied a good honey flow. The speed with which the combs were drawn out and filled with honey and brood was remarkable. Dandelion bloom ran into fruit bloom, fruit bloom into white and alsike clover, followed by a little sweet clover. Basswood also gave a good yield.

I had figured that two supers per colony would be enough to take care of any honey flow, since all brood and super combs had to be drawn from foundation. These were soon filled and I had to rush more. I was working 15 miles from the apiary and was able to visit the bees on week ends only. Every week end the supers put on the previous week were filled until each colony had four or five. With the limited number of supers and no time to extract, it was difficult to know on which colonies to put them and which to leave for another week. Several swarms were lost, which, with the shortage of super room, cut down the possible surplus.

From the package bees an average surplus of 150 pounds was obtained and all colonies left with plenty of winter stores, many being wintered in two stories well filled with honey. The old colonies gave an average surplus of 140 pounds in a location which was apparently as good. It had no basswood, but many times as many acres of sweet clover. They had about two-thirds of the supers filled with drawn combs, which was also an advantage. The old colonies had wintered well, but most of them had queens one year old.

A two-pound package with untested queen can be had in large lots for about $4.00 with express paid. Sugar at present prices would cost about 30 cents per colony, making a total expense of $4.30. The cost of hives, travel between apiaries, etc., will be approximately the same in both cases. The old colonies started with 40 pounds of winter stores the previous fall, and, after extracting, both old and new colonies were left the same amount of honey, so we must charge the old ones with 40 pounds of honey at 10 cents a pound, or $4.00. To this $4.00 must be added the work of packing, unpacking, interest on money invested in packing cases, and depreciation on packing cases, as the package bees had none of these expenses. This will bring the total to $5.00, so for this particular year the package bees had a decided advantage. The old colonies would have made a larger surplus if they had been requeened; but this would have cost about $1.00 per colony, and I doubt whether the increased yield would have been large enough to pay for the new queens and the work of introducing. Package bees save packing cases, labor of packing and unpacking, and cost of requeening as all packages are supplied with young queens. They also reduce the swarming manipulations to a minimum and, building up more evenly, make it possible to do the same operation with all colonies at the same time. I much prefer to handle these, as there is something fascinating about the way a small package builds up to a strong colony.

There are some drawbacks to package bees. For best results they must be received early enough to build up for the main honey flow. If their arrival is not timed properly, there will be a loss in surplus honey. One week sometimes makes a big difference in the yield. In the past five years two of my shipments have been delayed, and in both cases the shipper could not avoid the delay. The first time there was railroad trouble, and in the second, floods prevented the shipper from getting to his bees. For this reason, if for no other, I shall continue to winter bees. Many shippers are now refunding part of the purchase price if a shipment is late, or the full amount if

the buyer desires to cancel his order. If a northern man kills all his bees in the fall and for some reason his package bees are delayed a few weeks, it will practically put him out of business for that season as a honey producer. Dividing the order among several shippers in different states will help to avoid loss, although this is not practical with small orders.

During the seasons in which package bees were delayed the surplus was not so large as for wintered colonies, so the score is now even. My present plan is to winter only the best colonies. Those which are not up to standard are united, only strong ones being wintered. Package bees are purchased to make up the shortage caused by doubling in the fall. In most locations I believe this is as far as it is practical to carry out the plan of reducing colonies in fall and increasing with package bees in the spring. It may be that changes in prices and improvements in methods will alter this.

The package-bee business has come to stay and, unless something causes me to reduce the number of my bees, I expect to buy packages every spring, just as I do other supplies for the apiary.

Chicago, Ill. Ellsworth A. Meineke.

[In comparing the cost of wintering established colonies with that of purchasing packages in the spring, the Editor believes that the labor of establishing and feeding the package bees will nearly balance the labor of packing and unpacking established colonies. It would probably be more, if the colonies were killed in the fall as some have advocated, for then the labor of destroying the bees and caring for the equipment during the winter would have to be charged against the package system. This would materially change Mr. Meineke's figures. Again, in most localities more feeding would be necessary, which would increase the cost of the colonies built from package bees. Mr. Meineke's locality is apparently especially favorable for building up with but little feeding.—Editor.]

INSTALLING PACKAGE BEES

How to Transfer Bees and Queen from the Cage to the Hive

It seems to be considered quite difficult, at least for beginners, to put package bees into hives. Here is a good way to do it: Procure, if possible, at least one good comb for each hive. There need be no honey in this if the bees are to be fed immediately or if there is a honey flow on. Put this in the center of the hive, and, if you have a ten-frame hive, place four frames of foundation on each side, making nine frames in all.

Having prepared the hive, wet the bees so that they can not fly easily. Be careful that the water is warm enough not to shock the queen. Now open the package and remove the caged queen. Pry the metal off from the candy so that the bees can release the queen, and hang the cage in the hive between the frame of comb and the foundation. Crowd the frames as closely together as the cage will permit, to prevent an extra comb being built.

If you expect to use a friction-top feeder, it may be well to place it on at this time and put an empty hive body on the hive. Now dump the bees into this hive body, put the lid on and leave until the bees have gone below. As soon as they have done this, place an inner cover, with the block removed, under the feeder and leave for a week. By this time the bees will have accepted the queen, and she will be laying nicely.

Now remove the empty cage, crowd the frames together and add the remaining frame.

In case the frame of drawn comb can not be had, a queen-excluder between the bottom-board and hive is a great help in preventing absconding.

Wayne, Neb. Albert W. Watson.

NORTHERN BEEKEEPER GOES SOUTH

From Snow and Zero Weather to Peach Blossoms and Fragrant Clover Fields

Lord Milner, a famous British statesman, used to express the wish that someone would hit him in the eye just before he delivered an important speech because, as he explained, he would show more life and energy.

I sympathize with the idea, only I should be hit in the eye for my seeming neglect. Davis of Louisiana in his kind mention in the March issue, opens the way for me to pay a belated tribute to my southern beekeeping friends, who did so much to make my stay in the South a memorable and pleasant one.

I spent a week with the Hummer family at Prairie Point, Miss. Arriving there a stranger to them, they gave me a royal welcome and, if I had not arranged to meet Davis in New Orleans on a certain date, I believe I would still be there.

Leaving Chicago in zero weather and arriving when the thermometer read 70° was some change. I learned much, and we traded ideas until far into the night, every night except the one on which George Hummer organized a possum

hunt for my benefit. It was a beautiful moonlight night and will always be a memorable one. We were not successful in getting possums, but had great luck with polecats, bagging three with some reluctance. In spite of that slight annoyance I am going back soon, and only wish more northern beekeepers could go south. Reading about the southern people and the climate is knowledge; to meet them and thaw out is education.

At Madison last August, I met E. C. Davis and R. B. Willson for the first time. They both raved over the South, but my Scottish carefulness made me take all they said with a grain of salt. But they did not tell me half the story. To see bees working on peach blossoms and carrying huge loads of pollen on a December day is a dream to a northern beeman, and my cup of happiness overflowed when I lay down and slept peacefully among the clover blossoms.

Davis is some instructor; it was fine to hear beekeepers ask questions and to hear his replies. That smile of his is worth much, and his stock of stories nearly equals my own. He is guilty of adding to my vices. He taught me, a Scottish Presbyterian, to drink French drip coffee and to eat oysters. I did not sample any Louisiana honey, but if there is any southern honey to surpass the Spanish needle honey produced by the Hummers in Mississippi, I would like to know of it. Joseph M. Barr.

West Allis, Wis.

ALCOHOL-FORMALIN TREATMENT

Will Extracting Combs that have been Treated Taint Honey Stored in Them?

Possibly no subject is receiving more attention among beekeepers just at present than the alcohol-formalin treatment of combs that have been in contact with American foul brood. However, all previous contributions on the matter have been from expert, careful men, and, as this is written by one who is always making mistakes, perhaps it may be of interest to some who may be inclined much along the same lines as myself.

We have about 400 combs that have either been in foul colonies or are known to have been in supers over diseased colonies. In addition to these, we have 1100 good super combs that came from an apiary infected with American foul brood; and while very few of them may be affected, yet it is almost certain that some were taken from the brood-chambers at some time, as many have had brood in them, and the owner practiced lifting combs from brood-chambers into supers during the honey flow. We decided to treat all these combs instead of melting them up into wax as planned previously to the announcement of the new solution to the public.

First of all, we had two tanks made similar to those described by Mr. Barber. They hold two tiers of combs each, each tier taking 20 plain frames or about 18 Hoffman frames. A drum of the solution was ordered that holds 46 Canadian gallons. (Our measure is about one-fifth more than the United States gallon.) We soak the combs in water in a large wooden tub that will hold 50 combs in one tier, this work being done in our wax room in the basement of the honey house, as it is easily heated and the room is comfortable to work in at all times.

We filled the tanks with two tiers of combs each, and then proceeded to pour in the solution at one end of the tank. After about ten gallons had been poured into each tank, imagine our thoughts when we noticed that each tank was leaking at the bottom joints. The work had been done by an expert tinsmith, who stated that he had tested the tanks with water; but alcohol seems to go where water will not. (Is that the reason that so many people seem to prefer alcohol to water?) There was nothing else to do than to remove those combs and take the tanks back to the tinsmith.

The directions say to shake what solution you can out of the combs and then run them through the extractor. We shook out that lot, and were entirely cured from shaking any more combs. Shaking out the solution causes more or less spraying of the formalin fumes, and before I was through with this first batch that had to be taken out prematurely, I was nearly overcome with the fumes and had to go to the door repeatedly for fresh air. To add to my discomfort, I had on a pair of rubber gloves which were very tight on the fingers. The weather was cold, and my fingers were so numbed with the cold and lack of circulation that I longed for the good old boyhood days so that I might relieve my feelings by bawling in the approved boyhood way, so excruciating was the pain when getting my fingers thawed back to normal. Rubber gloves are necessary, but have them large if the work is done in cold weather.

Shaking the combs is a mistake—we are sure of that—and there is nothing gained by shaking them before putting them into the extractor. We now have the extractor touching the tank, and, as the combs are lifted out of the tank carefully, they are put directly into the extractor. The same few turns take out all of the solution in the same time that it takes if combs have been first shaken.

There are no fumes to speak of when this plan is used, and now that we have a large window opened at each side of the building instead of the door as at the first trial, the work is endurable even if not pleasant. However, for small lots of combs to be treated, outdoors is no doubt the proper place to have the tank.

I had quite a severe sore throat the day I first shook out the combs, and while I thought the formalin fumes would aggravate my cold, I was surprised next morning to find that my throat, which had been sore for days before, was now entirely normal.

We found that our 46 gallons would not cover the two tanks of combs when each had two tiers of combs placed in them. It would cover two tiers in one tank and one in another, leaving a bit over for good measure. But one trial convinced us that one tier handles better than two tiers in a tank, and we have been handling them in that way since.

The Editors and others say that all that is necessary is to submerge the combs for 48 hours in the solution and that all cells will be filled, no manipulation of the combs being necessary. They further state that combs bad with disease were submitted to the laboratory and all evidence of life was absent, so far as foul brood is concerned. The latter claim may be quite correct; but, in our experience, the combs do not fill up with the liquid fully unless moved around at different angles. There is no possibility of a mistake in this matter, as we have tested it repeatedly and are testing it every day. After the combs were covered with the solution, we started to move them sideways with a sharp stick with which we could pry in between the top-bars and shift the combs to one side. When we did this, countless air bubbles would rise, and over the surface of 20 combs we would lower the liquid in the tanks fully half an inch before the air bubbles would cease to rise. Now we move the combs about four times in the 48 hours that they are in the bath, and we always have air bubbles rise while doing this work. Possibly the fumes of the formalin kill all germs in the cells even if the fluid does not enter, but we are not taking any chances until we definitely know that such is the case.

These are all minor matters that I have mentioned so far. One serious question is still confronting me. It has been definitely proved that bees accept the combs after treatment, but has it been yet demonstrated whether super combs will cause trouble in the honey stored in them, by reason of retaining some of the formalin odors? Some years ago formalin gas was tried out here in Ontario for treating foul brood combs, and while it was not a success, probably because the gas would not penetrate sufficiently, yet one thing was quite evident. Combs thus treated retained the formalin to such an extent that clover honey produced in them the next season was unfit for table use. As H. G. Sibbald stated at our last convention, "it smelled like a horse stable." Some of our combs, that have been treated for over two weeks and stored in the honey-house where it has been cold all the time, still smell so strong of formalin that if put close to my nose it will make the tears come to my eyes, so great is the irritation. Warm weather may help to get rid of this odor; but at present I feel that it is a serious problem, and while we still intend to treat all the super combs mentioned, we are doing so with many misgivings. We are using the best grade of alcohol obtainable and number one quality of formalin, so what I have said about the solution's entering all the cells and the odor of formalin left in the combs, cannot be blamed to inferior material. Barring this question of super combs being contaminated, I still feel enthusiastic regarding this solution being a good weapon in fighting foul brood and I hope that my fears will prove groundless on that score.

In soaking combs we learned that, no matter how solid the granulated honey is, it will extract readily if the combs are soaked for 24 hours. We tried it out on half a dozen combs solid with granulated honey, and we were surprised at the results. Had we known this some years ago when thousands of pounds of buckwheat honey granulated in super combs and many combs were sacrificed because we did not know what to do with them, it would have saved us work and money.

In conclusion, our work to date with the solution has taught us a few things of which I might enumerate the following: Do the work in a well-ventilated room with open windows, or outdoors. Do not work near an open fire. Use rubber gloves and have them of a generous size. Do not under any circumstances shake out the solution from combs, but carefully lift them from the tank into the extractor and do the work at one operation. And soak all combs in water so that the solution does not get sticky with honey.

J. L. Byer.

Markham, Ont.

[Our experiments all indicate that there is no danger of tainting the honey when the right kind of alcohol is used. See editorials.—Editor.]

SIFTINGS

by J. E. Crane

It is a hopeful sign that already "Some of the state inspectors are establishing central plants for sterilizing combs" of foul brood, as reported on page 138 in March Gleanings.

* * *

I was wondering, after reading Dr. E. F. Phillips' article, commencing on page 140, whether it would be practical to have a small book printed with illustrations of pollen from all our honey and pollen-yielding plants, or at least the most valuable ones. I have often wished for such a collection that I might compare the pollen the bees were bringing in, and learn the source.

* * *

E. R. Root's article (see page 145) on "Honey in Miniature Sections" is full of interest especially for one who began keeping bees long before comb foundation made its appearance. I can not, however, agree with all Mr. Root says; and I do not like to disagree as it is not always easy to disagree and not become disagreeable. He says: "Without comb foundation the combs would be built crosswise or in any direction the bees happen to start their work." I think he must have forgotten how we used comb guides in those days—yes, guides that would lead the bees to build in any direction we desired. We produced tons and tons of honey in those days and had no trouble in getting our supers filled with combs as desired. As early as 1869 I had single combs built in supers, that were as handsome as any built in these days on foundation.

* * *

Again, I can not quite agree with Mr. Root in the value or importance of producing "miniature sections." I doubt if such sections could or would be furnished by supply houses much cheaper than the 4 x 5 section, and there would be four times as many. It would be four times as much work to make them and four times as much work to put in the foundation, and nearly four times as much work to clean off the propolis. Indeed, it seems to me that it would cost more to produce them than would be gained by the extra retail price for which they would sell. No, I think I can spend my time better than making these small sections.

* * *

What Mr. Engle says on page 156 about condemning "new ideas" is pretty good. If we would but stop and think, all we have that we prize most in our civilization was once a new idea. Whether it was a telegraph, a steamboat, a spinning machine, a train drawn by a locomotive, a flying machine or thousands of other things, they were once "new ideas," most of them laughed at and thought of no value.

* * *

R. H. Kelty's column, page 160, is a valuable addition to what has been written on the use of honey in automobile radiators. The tendency of the circulation of honey and water to become sluggish when the temperature drops to 15° or 20° below zero has seemed to be its weakest characteristic when used in auto radiators. The chemists ought to be able to overcome this fault. They have been able to harden vegetable oils to imitate butter. When gasoline was almost worthless, engineers were set to work to find new uses for it, with a present demand that is far beyond the demand for kerosene. Let the good work go on.

* * *

I want to thank Mr. Lenning for calling attention, on page 165, to an error in February "Siftings." He says the "overcoats" to the straw hives are made of bark instead of straw, and he is doubtless right. They are certainly picturesque, and protect the hives perfectly.

* * *

What J. A. Green says, on page 165, about "Uniformity in Equipment" is of great importance, especially to those just beginning to keep bees. I have followed A. I. Root's size of frame and find our last lot of frames does not vary more than $\frac{1}{16}$ inch from the size given by Mr. Green. Like Mr. Green, I decidedly prefer the long top-bars. Also, we prefer a plain to a Hoffman frame, and to prevent mistakes have preferred to have our frame stuff cut out in local mills or in our own shop. Well, let every young beekeeper read carefully Mr. Green's experience and remember it.

* * *

What Leslie Burr says, on page 152, in regard to handling non-spacing frames is well worth the careful consideration of those who seem to think there is nothing like a Hoffman frame. Mr. Burr's article bristles with good points, which no beekeeper should miss.

* * *

I almost covet Mr. Byer's new extracting plant. Our own honey-house was built over 40 years ago when we were producing only comb honey, and it will have to be changed to meet more modern conditions.

FROM NORTH, EAST, WEST AND SOUTH

In Southern California.—February passed by without rain, thus putting southern California on record as having the driest season up to March 1 since 1877. One man told us that in the year named only three inches of rain fell. But the long drouth was broken on March 2, and from three-fourths to two inches have fallen to date, March 5. Even this small amount has put a smile on the faces of the beekeepers, and many still hope for sufficient moisture to insure bloom enough to carry the bees through the year.

To say that we have had a pleasant winter would be putting it mildly, if we speak from the standpoint of the tourist, automobile traveler or in general the people in California for a good time. There has been scarcely a day that one could not enjoy himself out of doors in the beautiful sunshine and balmy atmosphere, giving one a satisfied, restful feeling. This all goes very well for the time being; but we, who have weathered some 25 seasons or more, know that this enjoyable weather must be accounted for later on.

Trees and all vegetation show the lack of moisture. Streams that should be running full are and have been dry or nearly dry all winter. Grain that came up months ago and should be 12 or 15 inches high has withered and in many cases it died at a height of two or three inches. Power companies have notified patrons to cut the use of power by one-third. It looks like a case of conservation on all sides to get through a season of very short rainfall.

The regular meeting of the Riverside County Beekeepers' Club was held on March 3. Beekeepers from all parts of the county were present. Mr. Lohrli, whose subject was "Prospects for 1924," said that he would have to change his remarks somewhat from what he would have said two days before. The rain had materially changed the conditions, and with each additional shower the prospects for the bees gathering enough nectar to survive would increase. Up to March 1, he could only say, feed more or let them die. Now they might pull through; at least, he hoped so.

County Inspector T. O. Andrews reported on "Conditions as I Find Them." In many sections of the county he reports a very neglected and discouraging condition. There are apiaries that appear to have had no care for months, and some with as many as 75 per cent dead, many showing that they died of disease. Very few and far between are those that have stores enough to carry them through to a probable honey flow in the spring. He says that in many places not 10 per cent as many colonies will be found as there were two years ago.

A committee was appointed to attend the meeting in Orange County on March 8 and get as much information as possible on the advisability of a central plant for the treating of diseased combs by the latest methods.

Honey plants, so far, have shown little or no growth. Orange trees are showing clusters of white buds, which mean bloom in a few weeks if warm dry weather should continue. This will be retarded considerably in the event of cool weather or wet and unfavorable conditions. But in any event, it looks like an early season for the orange. The general conditions spoken of in this article refer only to the citrus section and wild ranges. The great Imperial Valley, Palo Verde and Coachella valleys with their mesquite, alfalfa, cotton, etc., will likely make their usual crop of honey, rain or shine.

L. L. Andrews.

Corona, Calif.

* * *

In Northern California. During February, we have had barely enough rain to keep vegetation alive. The first three days in March brought a slight precipitation, and beekeepers and farmers alike are rejoicing that there is still hope. Our section has taken steps for the conservation of water, for we have had to date little better than half our annual rainfall. Although our situation appears serious, we have much sympathy for the suffering south where the lack of moisture is becoming acute. Fortunately at this writing (March 3) they are having a slight rain. Lack of moisture and extreme cold weather in many localities will mean a late season. In fact in some districts, seven and eight year-old and even older blue gums and pepper trees have been killed by cold weather.

Bees, likewise, have suffered greatly—not so much on account of the cold as through lack of stores and sufficient young bees to form a normal winter cluster that could easily withstand, without packing, the cold weather that we have experienced this winter. It is wrong to blame the cold weather for loss of colonies or even the fact that they are weak at this critical time, the breeding-up period. Cold weather such as we have expe-

rienced does not adversely affect colonies that had the right kind of stores and the right kind of bees last October. Close attention, when given to these two points last fall, and the fact that bees now have a plentiful supply of pollen and water will mean strong colonies for a honey flow or an increase.

Not only does it mean this but it means as well that such colonies need very little attention on our part, until they reach the point of starting queen-cells. Is this not ever so much better than the fussing and fretting and the doubling of weak colonies, with the attendant troubles of destroying puny queens, eliminating European foul brood and the lowering of the morale of an entire yard through robbing during inclement spring weather?

I mentioned above that it is necessary to breed the right kind of bees in October. By this I mean that either young or very prolific queens must be in colonies at this time, for it is only such queens that can be induced to lay a sufficient amount of eggs that late in the year, provided there is no honey flow on at the time.

However, the situation that confronts many beekeepers today is that they have not only many weak colonies but also quite a number of empty hives. The very best remedy for the present unfortunate condition (an outlay of many thousands of dollars in idle equipment) is that of placing immediate orders for packages of bees and queens. M. C. Richter.

Big Sur, Calif.

* * *

In Oregon.—The most outstanding item of interest to the Oregon beekeepers during the past two months was the Agricultural Economic Conference, which was held at Corvallis January 22 to 26. At this conference were representative men from the various lines of agriculture. The primary object of the conference was to outline a constructive program of agricultural development for the state of Oregon.

Each agricultural group met in conference and after extensive study and discussion drew up a proposed program of development for their particular branch of agriculture. The entire delegation numbering 535 met on the morning of the 25th to hear and adopt the recommendations of the various groups.

Beekeeping was represented by a fair-sized group which presented the following program of development for Oregon. Other beekeepers not at the conference may wish to add their suggestions to the program. Only an outline of the program is given. A more detailed report will appear in bulletin form later with the other group reports.

Program of Development.

1. Find Beekeeping Locations.—Special effort should be made to locate prospective beekeepers in the most desirable but unoccupied locations.

2. Disease Control.—Take definite steps toward eliminating disease by the area-clean-up method, and more extended use of the present inspection system. Special attention should be given to the more important commercial producing sections.

3. Better Management.—Determine by investigation what systems of management are best adapted to each of the leading honey-producing sections of the state.

4. Determine the Cost of Production.—Make a five-year study of the cost of producing honey in each of the three leading honey-producing districts of the state to determine the normal seasonal and local variations and the factors involved.

5. Advertise Honey.—Carry out a definite program of education on the value of honey as a food, through local papers, fairs, window exhibits, etc.

6. Co-operative Marketing.—Form a co-operative marketing association which should include Oregon, Washington and Idaho. This association should affiliate with other western marketing associations. Endeavor to secure a more equal distribution of honey on the general market at as near a uniform price as transportation will permit.

7. Co-operate with Fruit Growers.—Co-operate in securing protection from disease and spray poison, and in providing bees for pollenizing. H. A. Scullen.

Corvallis, Ore.

* * *

In Texas.—The month of February has again demonstrated that the superstition of the ground hog and his shadow may have something of truth in it. Indeed it looks as if many of our weather superstitions were based on the long-ago observations of men who were weather-wise. The whole month has been cold and rainy. The deepest snow in years fell the last week of the month. The bees have been quiet, but stores are going fast as brood-rearing is well advanced. The cold is holding back the honey plants to such an extent that when warm weather does come there will be a heavy spring honey flow, as all the spring blooming plants will come into bloom at once. A few sunshiny days occurred during the month, and on these the bees made up for lost time. The water carriers were so numerous that it looked as if a honey flow was on. Bees collected pollen and some nectar this month

from peaches, mistletoe, agarita and a few early-blooming mustards.

From the requests that come in for inspection so that bees can be moved from one county to another, it looks as if half of the bees in southwest Texas were to be moved this spring. Many beekeepers wear themselves and their hives out hunting ideal locations, only to find that every year they make a poor crop. One beekeeper told of moving 14 different times and having every crop poorer than the last, and then he sold out. The moving this spring is not by the beekeepers who prospect for better localities, but is by the beekeepers who in the last two years moved their bees to the hills and blackland belt to keep the bees alive. The prospects are so good now that these men are moving the bees back to their old locations.

Every beekeeper who has not received U. S. Department of Agriculture Farmers' Bulletin No. 1383, entitled "Food Values and Body Needs," should send at once to Washington, D. C., for one. In this bulletin the food needs of the body and the food values of certain substances are shown on charts. The chart showing honey will, at a glance, show why honey is the great health food. You should get this bulletin and compare honey with other similar foods. You can get some great talking points for selling honey. Even the vitamines in honey are given.

R. R. Reppert, Entomologist to the Extension Service of A. and M. College of Texas, is doing fine work along beekeeping lines. Wherever he visits beekeepers he is preaching the value of good queens and the absolute necessity of young queens. In a number of counties he has organized bee clubs. In other counties he has arranged with the county agent to buy queen bees collectively for the small beekeepers so that they can get the benefit of lot reduction in price.

San Antonio, Tex. H. B. Parks.

* * *

In Minnesota.—Minnesota has just passed through the mildest winter in the remembrance of the "oldest settler." Springlike weather without frost lasted until December 31, when colder weather prevented the soft maple and pussy willow from bursting into bloom. January had six cold days with little snow, but bees also had good flights on six days. February was again remarkably warm, with slight insinuations of green on city lawns. At this writing (March 5) the bees left in the open have one or two frames of brood, and appear not to have lost much in strength.

Bees wintered in the cellar are not, as a rule, taken to their summer stands in Minnesota until the soft maples and pussy willows bloom, about April 1. E. L. Hofmann (one of our largest beekeepers) takes his bees out about March 15. His theory is that an early removal gives the bees a chance to raise brood earlier and consequently longer, as compared with bees removed a few weeks later. Others maintain that late-removed bees appear to breed faster and dwindle less.

It is too early to predict what the winter mortality of bees will be. To judge from past years' observations, those who have a good bee cellar with a moderate, steady temperature, and have fed their bees 10 pounds of sugar syrup early in the fall will not lose any bees; others will.

The Hennepin County Beekeepers' Association made the following experiment in two successive winters. Of 24 beekeepers half agreed to feed all their bees ten pounds of sugar syrup after brood-raising ceased in September; the other half allowed their bees to winter on their natural stores. The proportion of winter mortality was in the ratio of 8 to 13 in favor of sugar-fed colonies. Scientific experiments on a large scale along this line may some day confirm this simple effort.

Very little honey remains in the producer's hands this spring. The prices seem to be firmer, but not much higher. White extracted honey can be bought in small amounts for 10-11 cents per pound. Comb honey, however, is exhausted. The demand for comb honey just now is brisk in the Twin Cities at $6.00 to $7.00 for No. 1, and $4.00 to $5.00 for poorer grades.

At the last Minnesota Beekeepers' Convention a committee of seven was appointed to work out a plan for co-operative marketing of honey. Mr. LeStourgeon of San Antonio, Texas, put the organization "bee" into the beekeepers. Everybody was in favor of some organization. The committee will hold another meeting next week and make a start for a state co-operative organization. The plan most favored is to start on a small scale two activities—first, the adoption of a common, uniform container and label; second, to buy up the honey of those producers who now dump it on the market, and market it through the association through regular channels and at uniform prices. This move is supposed to eliminate the market spoiler. No doubt other activities will be taken up later. Dr. L. D. Leonard of Minneapolis, Minn., is chairman of the committee.

Eventually it is hoped that all states will have a uniform organization under

the direction of the American Honey Producers' League. Francis Jager.
St. Paul, Minn.

* * *

In Wisconsin.— Wisconsin has been experiencing a spell of semi-spring weather, and the beekeepers as well as the bees are beginning to get active. During the period from February 17 to 29, there were several days when the bees were able to fly to some extent in the vicinity of Madison. A number of people who plan to start beekeeping this spring have been writing in for information, and the old timers are already asking about prices on labels and pails.

From just before Christmas until about the middle of February, there was very little demand for honey either from the stores or from the wholesale dealers; but lately the business has been picking up, and the demand is greatly improved. Honey seems to be moving freely out of the stores, and there is some demand for wholesale lots.

No general report on the conditions within the state so far has been received, but a few local beekeepers report that the clover in their sections has been badly damaged, and they do not expect much of a crop of clover honey this year. There is a chance for the clover in southern Wisconsin to be killed to a more or less degree, due to the fact that there has been a continual melting of snow which shortly changed to ice, forming a coating of ice over the fields. This is thought to have a tendency to smother out the crop. However, similar reports in past years have not borne out the pessimistic attitude of some of the beekeepers, and, if we do not have continued thawing and freezing in March, it is more than likely that the clover will come out in good condition.

The Wisconsin State Beekeepers' Association has entered a new field this year, in that it is preparing to furnish its members with plain pails as well as lithographed pails, comb-honey cartons and paste for sticking labels. A series of newspaper articles are also being prepared for distribution among the members who ask for them to be placed in local newspapers for the purpose of keeping honey before the public. A series of about ten of these articles will be prepared and run on mimeographed sheets, and if the members of the association cooperate in getting this material printed, the Wisconsin public will be treated to quite an extensive honey-advertising campaign. It is expected that over 360,000 labels, lithographed pails, honey cartons, etc., all bearing the Badger Brand trademark, will be used this coming season. The program which the state has laid out for the coming year includes the annual Chautauqua, to be held at Fon du Lac August 12 to 15; a celebration at the State Fair, to honor our worthy Superintendent, Gus Ditmer, Thursday, August 28; a state honey week just prior to Thanksgiving, and a honey-advertising booth at the Wisconsin Products Exposition to be held at Milwaukee.
Madison, Wis. H. F. Wilson

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In Indiana.— Comb honey in this locality is practically all sold. It is being brought in, however, from Chicago commission houses and retailed at 20 cents to 25 cents per section. Commercial producers still have on hand perhaps 20 per cent of their 1923 crop of extracted honey, though small beekeepers have long ago disposed of their surplus.

Our mail order trade has dropped off until it is now almost negligible, due probably to the activity of canvassers and to the increased handling of honey by retail grocers. Our local sales, on the other hand, through the grocers, have increased about tenfold in the last three or four years. I attribute this to local advertising and to the furnishing of a constant supply to the trade. In order to get grocers to handle honey in pails, one must first create a demand by judicious advertising or by canvassing the town for honey to be delivered by the grocer. By this means the good will of the trade is maintained, and when the consumer is ready for another pail he knows where to get it. In this way the cost of selling is reduced, and a far greater amount can be disposed of than when one resorts to intermittent canvassing.

We find that the use of lithographed pails has largely increased our sales. If possible, one should endeavor to sell only a uniform product in a uniform container. While the wholesale price of honey must necessarily vary with the color, the retail price should be the same regardless of color. It is a mistake to sell both light and dark honey, asking a lower price for the dark. If this is done the result invariably is that very few people will choose the lower-priced honey; whereas, if the prices are made equal, the amber or dark often will be given the preference. A better way, if one can, is to blend a light amber, unless patrons have been educated to a particular color or flavor.

Although the honey crop of 1923 was only about two-thirds of normal, the price is very little better than a year ago. This does not signify, as claimed by some, that decreased production tends to increase prices. It means that the average beekeeper is too "independent" to organize

for his own protection, and that he will not use business methods in marketing. Present prices are largely a result of shipping to commission houses where honey is shoved off at a price often below cost of production, and anything or nothing is returned to the producer. It seems that it is only the farmer and the beekeeper who permit the buyer to determine the price of their product. And then it is these same commission houses that quote the prices for the rest of us.

Bees apparently are in good condition though some are short of stores. Clover was looking fine at the beginning of winter, but it is rather early to say what the spring appearance will be. However, we have had an abundance of rain and some snow, and we are hoping that there will be a crop. E. S. Miller.

Valparaiso, Ind.

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In North Carolina.—Not in a number of years has the vegetation that foreruns the honey-bearing flora been so backward as at this time, due to the unusually severe weather that has gripped this part of the country especially during February. However, this is really a harbinger of good for beekeepers in that it means that the flora will be late in putting out, and therefore less liable to be nipped by frost.

This is just what happened to the early spring flora two years ago and resulted in the "leanest" honey year for North Carolina in a great while. Altogether, the outlook for a really good honey season is just now quite bright, but much depends upon whether there will be late frosts to cut the nectar supply as the honey-bearing plants come into bloom. Every day that bees can fly now they are bringing in the pollen and considerable nectar, especially from maple, and the earlier-blooming fruit trees, such as plum and late fruiting peach, the latter just beginning to bloom (March 9).

The fruit bloom will be in full swing during the next three or four weeks, and then the wild flowers will predominate, especially in eastern Carolina, these including the tupelo gum, black gum, holly and gallberry, which constitute the main sources for surplus honey.

Bees have wintered very well indeed, considering the severe winter they have had to endure, the hardest in a number of years. It is too early to form any adequate estimate, but doubtless the losses for the winter and spring will not be over five per cent, and in many yards not that heavy, although there was practically no packing worth mentioning especially among the larger beekeepers.

In the home yard of the Lower Cape Fear Apiaries two one-frame nuclei that were shown in observation hives at the 1923 state fair, then brought home and packed without additional bees but with ample honey, have evidently come through the winter nicely and are working quite strong. A year ago a frame of bees with queen, that were shown at the state fair, were packed just as these have been and came through fine, gathering during the season 278 pounds of honey that was exhibited with the same queen and a frame of bees at the 1923 fair. One of the two colonies mentioned as just coming through the winter in good form has really this same queen and her frame of bees that were in the 1923 fair. It is too early yet to form an opinion as to how this queen will measure up, as this is doubtless her third year of service. She built us an amazingly strong colony last season, but no swarm was permitted or division made. The colony this queen built up last season is now especially strong and has a young queen reared after the old queen was taken to the state fair in October.

In Piedmont and western Carolina the beekeepers, heartened by a very good yield of sourwood and other fine types of honey in the past season, are preparing to give their bees the best attention possible, with good promise, so far, of another good season. In fact the outlook is fine all through the state for good yields, since the flora is being held back by the late severe weather, and bees are reported to have come through the winter in fine condition in the middle and western as well as the eastern part of the state. W. J. Martin.

Wilmington, N. C.

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In Alabama.—According to reports from the office of the Commissioner of Agriculture and Industries, State Capitol, Montgomery, arrangements have been completed for an inspector in this state. All shippers of package bees and queens and all beekeepers who have or suspect that they have foul brood in their vicinity should apply to him for inspection.

Up until March 9 the weather was ideal. The trees were beginning to bloom, the bees were bringing in pollen and the queens were enlarging the amount of brood very rapidly. We were preparing to begin queen-rearing on March 10. That day it started turning cold with a strong wind from the northwest, and on the morning of March 11 the thermometer registered 28 degrees above zero. The effects of this are yet to be seen, but it will doubtless be very harmful to the bees.

J. M. Cutts.

Montgomery, Ala.

In Ontario.—Since sending in my last notes, the weather here in Ontario has been of the old-fashioned Canadian winter type—steadily cold with a heavy snow fall. Many have asked how the bees are wintering and how stores are holding out—the latter query being prompted by reason of an abnormally mild December which started brood-rearing in many colonies at that time, judging by reports to hand as well as by our own experience in breaking up a few diseased colonies early in the winter. To both of the questions I must plead ignorance, for I have not looked near a colony outdoors for many weeks. Even if we could do any good (which is doubtful), any examination at this period, in our district at least, is almost impossible as the hives are for the most part covered deep with snow and the roads are very bad to travel to the apiaries. So the bees will just have to take chances until Old Sol gets busy and makes things a bit easier for us to go to the yards.

Some years ago when the matter of wintering in cellars was given such prominence by Gleanings, in one of my periodical hallucinations, I decided to build an underground cellar with cement top, all covered with five feet of earth. I had visions of wintering more bees inside at that time. After several years' use of this type of cellar, I certainly am not enamored with that style of winter repository. I think that a roof of heavy lumber, with a few feet of sawdust on top instead of earth, can be built just as cheaply, be just as well insulated and get away from the dampness that has always bothered us, in the way of moisture forming on the roof and dripping down on the hives all winter. We have but 60 colonies in one compartment of this cellar, the balance being used for the storage of potatoes.

Last fall we had excessive rains just before severe winter set in, and moisture is the worst this year we have ever experienced. Other seasons when the thermometer was constantly at 44 to 45 (it never varies more than one degree), we blamed lack of sufficient ventilation as the cause of this moisture on the roof; and we had an idea that if the temperature was higher than this, the moisture would disappear. This year for some reason I cannot explain, unless it be that the 60 colonies are very strong with bees, a tested thermometer has stood constantly at 49 to 50 degrees, and yet the moisture is bothering more than ever. I am convinced that it is soakage through the cement roof, as the ground was thoroughly soaked about January 1.

Although the floor is actually wet from drippings from the roof of the cellar, the bees appear to be fairly quiet and at this date (March 8), not a single colony shows a sign of dysentery. All winter, clusters as large as a pint of bees in some cases, in others not much larger than one's fist, have been on the front of the hives continually even if the entrances are the full width of the hive and an inch deep. Bees in the clusters are very quiet and can be touched without disturbing them very much. I know little about cellar wintering and do not venture to predict how they are going to come through, but so much clustering out in the cellar is something new in my limited experience in inside wintering. Why are they outside? Is a temperature of 50° too high for comfort if all remain inside? Will the consumption of stores be higher than when the thermometer stood at 44° instead of 50° as at present? These and other questions of a similar nature have come to me quite frequently, and I suppose some of them will soon be answered as we hope to have them outside again in three or four weeks.

Mention has been made in recent issues of Gleanings of lectures on beekeeping being sent out by radio broadcasting. I agree with friend Crane's hint on this subject that, if the lectures are confined to propaganda on the uses of honey and developing sales of honey, they will be more in order just at present than lectures on handling of bees.

I notice that most of these lectures have been given in the daytime, and if our experience is similar to other radio fans, the reception of these lectures will be confined to local listeners. We have a very efficient five-tube Neutrodyne set and our dependable daylight range is limited to Toronto, Buffalo and Rochester. During cold dull days in early winter Detroit comes in occasionally but can not be depended upon. Our night range is practically continental in scope. Lectures given to popularize the use of honey should if possible be sent out after dark to be most effectual.

While I have, as previously stated, no idea as to how bees are wintering, conditions seem to be perfect for clover coming through in good shape. A continuous blanket of snow since the new year has protected the clovers, and there is no frost worth mentioning in the ground. I have just returned from a cemetery where a grave is being dug, and it was not necessary even to use a pick to break through the bit of frost on top of the ground. With but little frost in the ground, when the snow goes off, "heaving" of the clover plants is not usually so bad as when frost is deep under the roots of the plants.

Markham, Ontario. J. L. Byer.

HEADS OF GRAIN FROM DIFFERENT FIELDS

J. L. Byer's New Extracting Plant. I have just noticed a mistake in my article, "The Central Extracting Plant," at the top of the second column, page 148, March issue. It states there, that "the extracting floor of the main building is on a level with the highway." The fact is the extracting-floor and the unloading platform in the garage are on a level with the floor of the truck rack in which the honey is drawn home from the outyards. For shipping honey, of course, we either drive into or back into the large door which opens into the basement and which is on a level with the highway. In other words, the floor of the basement is on a level with the highway, instead of the floor of the extracting room.

Markham, Ont. J. L. Byer.

Jay Smith's Lincoln Sedan. Jay Smith's article in February Gleanings, on "Selling Honey," throws quite a bit of light on the psychology of the honey buyer. But, to my mind, he has overlooked the best form of advertising. Newspaper advertisements, signs and honey displays all play a part, but they lack the "pull" of the real honest-to-goodness live bees themselves.

I would like for him to supplement his honey-for-sale sign by placing about half a dozen hives of bees on the lawn near the honey sign. Give the hives a fresh coat of white paint, and tier some of them up four stories high, whether they need be or not. I will admit, however, that I do not expect, as a result of those hives of bees, that he will find himself in possession of a Lincoln sedan, but I do believe that it will help to buy gasoline for the "Lizzie." Leslie Burr.

Willits, Calif.

Corncobs for Smoker Fuel. At our recent short course held at Iowa State College, a very interesting exhibit was given by Dr. O. R. Sweeney of the Chemical Engineering Department.

Dr. Sweeney has gained a national reputation on the utilization of corncobs. In a conference with the Beekeeping Department, the discussion was developed on the smoker fuel used by beekeepers. The ideal fuel was defined to Dr. Sweeney as that which would give a maximum of smoke that is not disagreeable to the operator and which is a cool smoke. Immedicately corncobs were suggested, and Dr. Sweeney started to work on the problem. The result is that corncobs are put through an ordinary feed chopper, which is available on every farm. This makes rather uniform pieces of the corncob. At first the beekeepers felt that this material was not desirable in that it was too fine. The exhibition showed very clearly that this material would light easily, and would give off an immense amount of smoke which showed no temperature and was not offensive to the operator.

The attractive feature of this material is the length of time in which it will hold fire. The corncob material is very slow to burn out completely. In corncobs the beekeeper has the material which is quite readily available, and to prepare this for smoker fuel is certainly no trouble. F. B. Paddock.

Ames, Iowa.

Peter Schaffhauser, Havelock, N. C., and his two champion colonies of Carniolans. Each of these colonies filled eight full-depth extracting supers in 1923.

Improvements in Treating Brood Diseases. We have had a foul brood law and inspectors here in Colorado for more than 20 years, but foul brood is here yet. However, time has brought some improvement. First, we could save only the bees; all the rest had to be burned. After a while, we could save the hives by burning them on the inside. Next, we could save the brood

by permitting it to emerge in tiered-up hives; and now we can save the good and valuable combs by treating them. What next? Can't we have some remedy to prevent the disease or cure it right in the hive without disturbance to the bees? Daniel Danielsen.

Brush, Colorado.

Shortage of Moisture in the West. Abnormal conditions seem to exist over a great portion west of the Rocky Mountains. Up to March 1 southern California has had the dryest outlook in 40 years. While Utah had an excess of autumn moisture we have only 50 per cent of irrigation water stored in the mountains, which may mean a shortage next summer. Idaho is even shorter than Utah. Of course, spring storms may mitigate the danger some but they are not apt to do so.

Bees have wintered unusually well, as they have been flying nearly every day for a month. I find more honey in producers' hands that I had thought was held, and some dealers are well loaded up. They report sales to consumers slow. I am shifting to comb honey, all except my home yard of 200 colonies. It seems that the production of comb and extracted honey has reached a balanced condition, so each can command its deserved price, but I think the market and consumption can become unbalanced sooner by an overproduction of comb than of extracted honey. M. A. Gill.

Hyrum, Utah.

Securing Surplus from Manzanita. The first consideration in getting a honey crop from manzanita is the condition of the colony the preceding fall. A good queen, just commencing to lay about August 1 and not having less than three pounds of bees, is about right. If there is a tarweed honey flow on at this time, all is well; the bees will do the rest. They will rear frames of brood (two cycles of seven frames each) before going into their broodless period in November. All these bees will be in their prime if wintered well when the manzanita blooms. Perhaps spreading brood will help at this time. In most seasons the entire flying force of the bees must be produced the fall preceding the desired honey flow, for the manzanita generally starts to bloom at the break of the broodless period. In fact, it is the first pollen and nectar from their bloom that often start the colony to raising brood. To get any quantity of this honey, the colonies should be well packed in winter, even in California. And in the manzanita region in particular, the only way I have ever got a decent crop of honey was to pack the bees until spring frosts were over.

Delhi, Calif. Robt. W. Stratton.

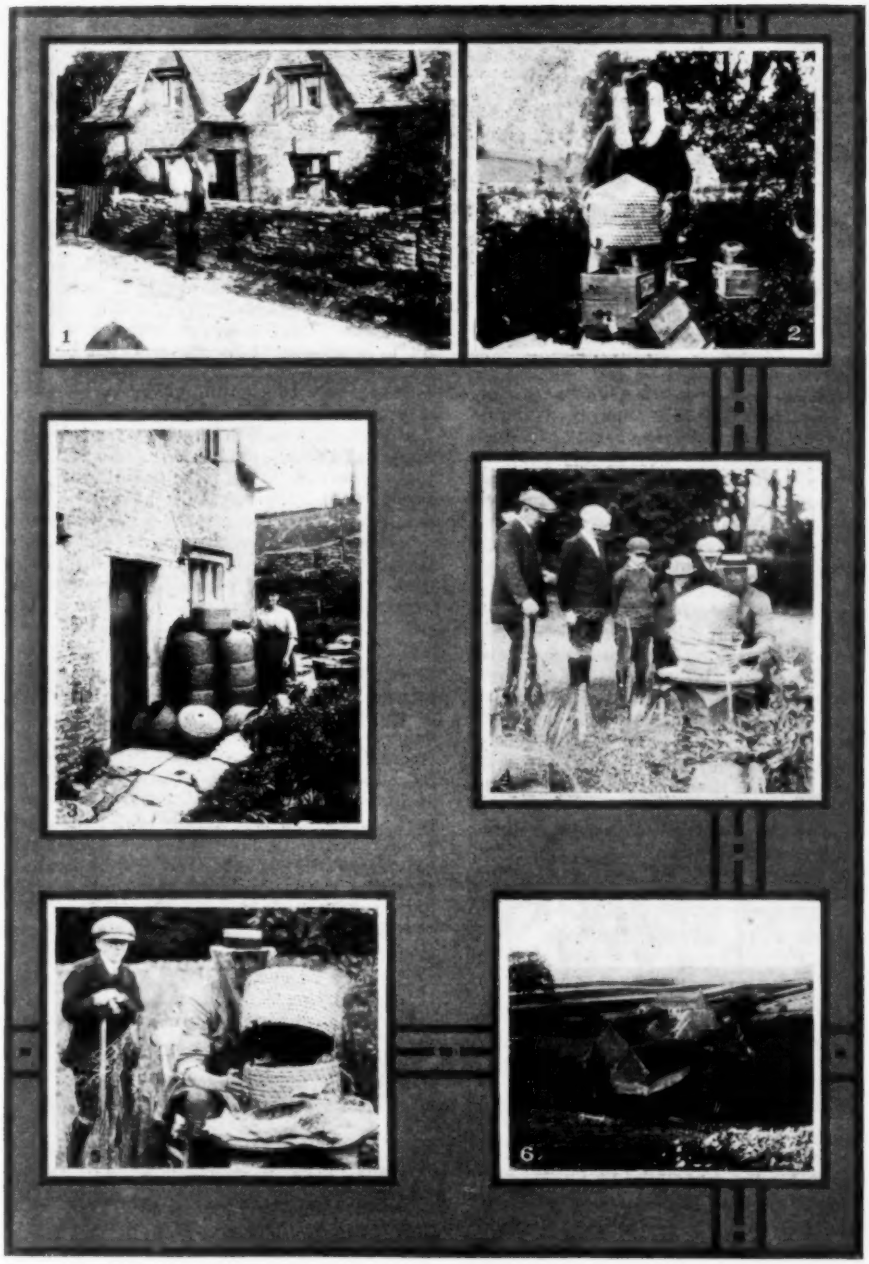
Causes of Winter Loss. "A chain is no stronger than its weakest link" applies to beekeeping quite aptly, and if any of a number of necessary details in winter preparations is neglected, there is a chance of incurring losses. How often one sees more than one detail carelessly overlooked! To leave an aperture of even the thickness of a table-knife between the side and top packing is to create conditions similar to an open transom near the ceiling of a room. I once saw a yard in which most colonies had the packing about two-thirds the way up the hives and a sack of packing on top. They wintered around 50 per cent.

Ayr, Ontario. L. J. Hederick.

Early Honey in Louisiana. Bees are in as fine condition at the present time as I have ever seen them and, if the warm weather keeps up, the package shipment business will be double that of 1923. All package shippers are well supplied with orders, and, unless we have a very cold spell between now and shipping time, there will not be any delays or disappointments such as both the shipper and the receiver had last year.

I have just returned from a visit to some of our package shippers, and find some of the colonies have already reached the proportion of 50,000 bees, and the storing of honey has begun in earnest from the willow which is now blooming as far north as the central part of the state. The willow tree is peculiar as to its blooming habits. While one tree is blooming another is just beginning to show its green leaves, while another is apparently in the dormant state. The result is, where there is a large acreage of these trees the honey flow is continuous for 30 or more days. At this date (March 9) there are many colonies in this locality which have stored 30 or more pounds of honey from this source. On January 25 I visited the western part of this state and found as much as 40 pounds of new honey stored in supers from the May haw, which is very abundant out there. E. C. Davis.

Baton Rouge, La.



QUAINT METHODS AMONG SHEPHERD BEEKEEPERS IN ENGLAND.

Fig. 1.—A typical Cotswold beeman in front of his cottage home. Following his occupation as a shepherd he has kept bees chiefly in skeps well over 50 years. Fig. 2.—The skeppist is seen about to throw a swarm into its traveling box ready for the buyer to collect. Fig. 3.—The home of the straw-skep maker with a pile of hives ready for market. These are of bushel capacity, and are made with wheat straw. Fig. 4.—The village schoolmaster and some of his pupils being shown how bees may be driven from their hive to avoid killing them. The method is that known as "close driving." Fig. 5.—"Open driving" in progress. On a fine day the bees with their queen run above in about 10 minutes. Fig. 6.—Typical of the Cotswold country. White clover is grown largely for sheep feeding and provides the main honey flow.

TALKS TO BEGINNERS

Geo. S. Demuth

In the South the beginner can now open his hives to examine his colonies, choosing a warm day when the bees are working well, but in the North it is best to wait until the latter part of April or the first of May before disturbing them by taking out any of their combs. A good rule to go by to make this first examination is to do it during fruit bloom if the weather is favorable at that time.

Before attempting to open the hive to examine the inside of the bees' home, the bee-smoker should be lighted and going well so that it will not go out during the operation, and the beginner should wear a good bee-veil, having it arranged so that bees can not get under it. While it is not necessary to wear gloves when handling bees, beginners usually feel safer if they have a pair of bee-gloves.

How to Open the Hive.

The operator should stand at the side of the hive (never in front), and before taking off the cover it is well to give a light puff or two of smoke at the entrance to subdue the guards there. This is not necessary during a honey flow, but the beginner will find it a good precaution till he learns when it can be omitted.

Remove the outer cover, if a double cover is used; then with the chisel-like end of the hive-tool pry up one corner of the inner cover not more than one-eighth of an inch and blow smoke into the crack. Do the same with an adjacent corner, then lift the cover, being careful to blow smoke under it as it is raised, to drive the bees down on the far side. Now give a few light puffs of smoke over the tops of the frames (never down between the frames), to drive the bees down among the combs. Most beginners use too much smoke at first. Only enough should be used to keep the bees under control.

Next, pry the set of frames toward the opposite side of the hive, using the hive-tool as a pry between the near side of the hive and the first frame; then pry the frame loose from the adjacent frame, when it is ready to be lifted from the hive. If, for any reason, the first frame can not be taken out without bruising the cappings of honey. the second or the third frame may be taken out first. Lift the frame gently, being careful to avoid rolling the bees against the adjacent comb. When the first comb is out of the hive, it is well to set it into an empty hive or a box made to hold one or two combs. Any of the remaining combs can now be removed and examined at will by being careful to keep the bees constantly under control with the smoker.

What to Look for in a Comb of Brood.

When a comb is taken out of the middle of the brood-chamber it should be carefully examined, for it reveals many things of interest. Note that some of the cells are sealed over, while others are open. In the upper corners of the comb there should be some sealed honey. This can be distinguished by the appearance of the cappings. To be sure that this is sealed honey, the capping can be torn away from one or two cells to reveal the honey beneath. Next, look for capped cells in the middle of the comb. The cappings here have a different appearance from those over the honey. This is sealed brood, if the comb is one from the middle of the brood-nest. To be sure of this, tear away a capping and note that it contains an immature young bee.

At the outer margin of the area of sealed brood in the first open cells, full-grown larvae may be seen coiled tightly at the base of the cell. Beyond the full-grown larvae toward the outer edge of the comb smaller larvae will be found, and beyond these still smaller larvae, and finally eggs can be seen. In order to see the smallest larvae and eggs the comb should be held so that the light shines into the cells. It is important that the beginner learn to see the eggs attached to the base of the cell for he will need to look for eggs on many occasions.

Between the upper margin of the brood and the lower margin of the honey there are usually a few rows of cells containing pollen. This can be seen packed down in a solid mass in the cells. By using a toothpick some of the pollen can be dug out, when it will be seen as a mealy-like substance varying in color but usually with yellow predominating. By looking carefully, cells may be found having two little pellets of pollen not yet packed down, but lying loosely just as the worker left them when she kicked them from the pollen baskets on her legs.

By looking carefully at the open cells it will be noted that some, especially in the lower corners of the hive, are larger than the others. The cells of large diameters are drone-cells. These measure about ¼ inch in diameter, while the worker-cells measure about 1/5 inch in diameter.

It is not necessary to tell the beginner that most of the bees in the hive are workers. In the South some drones may be found already emerged, but in the North drones are usually not reared until May. These large bees can readily be distinguished if any are present, and when found they can be picked up with the fingers without danger, for drones do not have a sting.

By working carefully and examining each comb on both sides, the beginner may find the queen the first time he examines the colony. If the work is done carefully so that the queen is not frightened, she often goes on with her work of laying eggs even while the comb is out of the hive; especially is this true of Italian queens.

Finding Out What the Colonies Need.

By noting conditions as the combs are examined, the observer learns much about the condition of the colony. The presence of worker brood in all stages of development indicates that the colony has a normal queen. The presence of sealed honey in the upper corners of the comb and in a greater portion of one or two of the outside combs indicates that the colony has plenty of stores. The presence of drone brood (if any) indicates at least that the colony is fairly strong and prosperous, for drones are not reared until the colony becomes prosperous except in the case of a failing queen or queenlessness. The presence of many empty cells, if any, indicates that the bees do not need more room at this time. In the North such colonies need only to be kept snug and warm during April by seeing that the cover fits down all around, by leaving the winter packing in place, and by putting in the entrance-closer to block down the entrance to one or two inches in width and not more than three-eighths of an inch in height.

How to Correct Common Defects.

In the North, colonies that occupy less than four or five of the spaces between the combs the first of April are too weak to build up to most profitable strength in time for a honey flow in June; but, of course, they may be able to build up for the latter part of the honey flow or a later honey flow if the location furnishes one. One would expect that uniting two or three such colonies at this time would be advantageous; but, as a rule, it is better to let them build up separately as much as they will and unite just before the beginning of the honey flow. Another way, which is especially attractive to the beginner in the North, is to order a two-pound package of bees from the South to arrive the latter part of April or early in May. Such a package of bees without a queen added to weak colonies at that time causes them to build up with great rapidity. Full directions for uniting these package bees with the weak colony are usually furnished by the shipper.

Colonies that are queenless or have an old or failing queen are more difficult to handle, but it is possible even for the beginner to purchase a queen from the South and introduce her to such a colony. As a rule, however, it does not pay to try to save and build up a colony found to be queenless in April. A good way to dispose of such a colony is to unite it with a colony having a queen, but which needs more worker bees. This is done by taking off the cover of the queenright colony and laying a sheet of newspaper over the top, then taking off the bottom of the hive of the queenless colony and setting it directly on top of the newspaper. The newspaper should have a few pin holes punched through it so that the bees can gnaw holes through it.

As a rule, the beginner is not confronted with the problem of too little room for brood-rearing unless his hives are smaller than the standard ten-frame hives; but if the bees become crowded in a single brood-chamber previously to the main honey flow, a second story should be added to give room at least for some of the early-gathered honey, so the queen can utilize the brood-chamber for brood. The second story should contain empty combs if they are available. If not, frames filled with foundation should be given. In the North it is not necessary to give more room until some time in May, but in the South it may be necessary to do so this month.

Sometimes the bees are able to gather enough nectar from the fields during April and May to supply their needs for spring brood-rearing, but too often they are not able to do so. In such cases if they were not supplied with a large reserve of honey carried over from last season, they will not be able to rear as many workers for the harvest as they should. If their supply of reserve stores runs low they will reduce brood-rearing, which in turn will reduce the amount of honey they store.

In the South where brood-rearing is already well advanced and large amounts of stores are being used, a close watch should be kept to be sure that the colonies do not run short of honey. The safest plan is to see that each colony is supplied with not less than 10 or 15 pounds of honey in advance of their needs, being sure that the supply is not reduced for even a single day. If feeding is necessary it can be done as described in these talks in the March issue. In the North the bees will not consume much honey during April, but will consume a large amount during May.

BEES, MEN AND THINGS
(You may find it here)

"By breeding my bees up in the spring in a two-story hive, then reducing to a single story at the beginning of the honey flow, I find that I can produce nearly as much comb honey as extracted honey per colony."—John Fenner, Monroe County, Pennsylvania.

"I would be glad if you would publish the names of present subscribers to Gleanings who were first-year subscribers 50 years ago. I was among these, and should recognize as old friends any others."—F. A. Snell, Carroll County, Ill.

"In reply to Leslie Burr I will say that manzanita is quite a nectar-bearing plant, but madrona is a better yielder when conditions are favorable. Frost often kills madrona bloom here on the California-Oregon state line."—Bob Vincenti, Siskiyou County, Calif.

"Fireweed furnishes the main honey crop here, but there are never any such dream flows as are reported in Gleanings. We manage to obtain about 100 pounds of surplus honey which is considered good here. In fact, it is nearly twice as much to the colony as other beekeepers in this vicinity produce."—O. H. Stone, King County, Wash.

"I use the Jumbo hive and also the Standard eight-frame hive with a food chamber above. Either hive seems to answer the purpose of supplying an abundance of food to tide over from fruit bloom till clover, though I prefer the Jumbo. Foul brood has nearly cleaned out the back-lot beekeepers. Those who are left are fighting hard to eradicate it, and succeeding fairly well."—A. J. Soderberg, Bureau County, Ill.

"I cut a bee-tree on February 27, and found sealed brood as well as young bees emerging. This colony had 40 pounds of honey and was strong in bees."—Wm. Marshall, Dekalb County, Ill.

"I got my start in bees by capturing a fine swarm a year ago last fall. This colony came through the winter in good condition, and last year made me two more colonies as well as 125 pounds of honey. They also stored enough honey for winter. It was mostly sweet clover honey, the finest I have ever tasted."—Jas D. Lamont, Ontario.

"Bees in New Hampshire apparently have wintered well. We had a mild December and January, so that they were able to fly several times during both months. February, however, was cold. All the colonies that were packed that I have examined seem to have come through in good condition, and unless we have a very cold spring the outlook is promising."—J. R. Hepler, Strafford, County, N. H.

"The orange bloom is a complete failure in this part of Florida. I have examined 1000 acres of groves and do not find one tree in fifty that shows even a scattered bloom. Other nectar sources are in normal condition, and bees are just making a living. There will be no orange honey here."—Harry Hewitt, Orange County, Florida.

"I tuned in my radio for Prof. R. B. Willson's talk on honey, which was broadcasted from Station WEAF New York City on February 27. The talk was surely appreciated."—I. W. Westlund, Pine County, Minn.

"My bees, which have been out all winter without any special protection other than the double-walled hives, are as strong and healthy as colonies can be. On February 29, a nice warm day, I opened the hive and found that out of ten frames of honey they still had nearly five full frames left. This will surely last them until the honey flow starts."—C. F. Schweigert, Mercer County, N. D.

"The low prices and slow sales of honey are having a great influence on the number of young men who wish to learn the business of honey production. When conditions are favorable I have many inquiries from such men, but this year there have been very few."—E. F. Atwater, Ada County, Idaho.

"I sowed eight or nine acres of Hubam clover with barley as the nurse crop and when the barley was harvested the clover was nearly as high as the barley, and was nearly ready to bloom. Harvesting the barley, of course, put the Hubam back, but it continued to grow and shortly began to bloom. Cutting it back caused it to branch very much, and it kept on growing and blooming until it was frozen."—W. L. Porter, Lenawee County, Mich.

"One of the best points brought out in the meeting of the North Carolina State Beekeepers' meeting held at Washington, N. C., on January 17, was that 'spring management should be done for the most part in the fall of the preceding year.' Strong colonies with plenty of stores and a vigorous queen in the fall need no attention in North Carolina in the spring. This might also be applied to other places."—J. E. Eckert, Wake County, N. C.

JUST NEWS
Editors

The Division of Bee Culture, University of Minnesota, will offer a beekeepers' short course May 13 to 16 inclusive, at the University Farm, St. Paul, Minnesota. Section 1 of this course is for beginners and beekeepers who wish further information on the production of honey. Section 2 is to be devoted to bee diseases. Actual treatment of American foul brood combs by the new alcohol-formalin method will be demonstrated. This work is in charge of Prof. Francis Jager, chief of the Division.

* * *

Prof. R. B. Willson, Extension Specialist in Apiculture, New York State College of Agriculture, Ithaca, New York, will make a trip to Medina, Ohio, and Ashtabula, Ohio, on April 1 to study, first hand, the problems connected with the sterilization of diseased combs with the alcohol-formalin solution. It is also expected that one of the New York inspectors of apiaries will accompany Prof. Willson. These men will then be ready to assist New York beekeepers in saving their combs to the best advantage during the coming season.

* * *

Warren Whitcomb, a senior in agriculture at the University of New Hampshire, is at present conducting a survey of the beekeeping industry in New Hampshire with special reference to the kinds and amount of honey produced and to disease conditions. Mr. Whitcomb expects to spend about half his time during April and May in extension work in bee culture with special reference to the eradication of the brood diseases. New Hampshire has no foul brood law, and for this reason is not permitted to send bees into neighboring states.

* * *

According to data secured from the Bureau of Foreign and Domestic Commerce the total amount of honey exported from the United States during the calendar year 1923 was 2,086,008 pounds, which compares with a total of 2,712,860 pounds for 1922. The total receipts from all countries, including Porto Rico and Hawaii, were 4,368,960 pounds for 1923 as compared with 5,738,738 pounds for 1922. Of the total amount received during 1923, 4,003,990 pounds came from Porto Rico and Hawaii, which compares with a total of 3,717,978 pounds for 1922. The total imports from other countries, 364,970 pounds, compare with a total of 2,020,760 pounds for 1922. It will thus be seen that our total imports are more than double our total exports. During 1923 we imported from all countries including Porto Rico and Hawaii 3,618,195 pounds of beeswax and exported only 118,456 pounds.

* * *

S. S. Knabenshue, editor of the Western Honey Bee, has asked to be released from his duties as editor on account of his advancing age, he having passed his 78th birthday. J. W. Ferree has been appointed to take his place.

* * *

The quarterly bulletin of the State Board of Florida reports for the quarter ending December 31, that 51 apiaries (2826 colonies) were inspected and no disease found. Not many northern states could make a report like this.

* * *

"Unsere Bienen" is the title of a new book in German by Pfarrer August Ludwig. It is a complete text on bees and beekeeping, having 448 pages. The book is published by Fritz Pfenningstorff, Berlin.

* * *

The Journal of Commerce of March 3 reports that a full carload of California honey sold in New York two years ago has recently been bought for California trade at a substantial advance over the original sale. The price paid by the coast buyers is reported to have been 13½c f. o. b. New York, and the honey is to be shipped back to California via the Panama Canal. This peculiar transaction was brought about by the failure of the California honey crop last season.

* * *

A meeting of the Maine State Beekeepers' Association will be held on April 2 at the University of Maine, Augusta, Maine. Geo. Yeaton is secretary of this association.

* * *

Membership in the International Congress of Beekeepers can be had by writing to C. Vaillancourt, care of the Minister of Agriculture, Quebec, Canada. The subscription rate is $2.00 for individual membership, and $10.00 for associations, governments, provinces and towns. Many American delegates are expected to attend the seventh International Congress at Quebec Sept. 1 to 4, 1924.

* * *

Prof. F. B. Paddock, Ames, Iowa, has briefly summarized some of the service the American Honey Producers' League is rendering for beekeepers, as follows:

(Continued on page 257.)

GLEANED BY ASKING

Geo. S. Demuth

Time Required for Building up Two-pound Packages.

Question.—How long does it take for a two-pound package of bees to build up to a full colony? Harry Klein.
Wisconsin.

Answer.—This depends upon weather conditions and the colony's food supply. Under favorable conditions a two-pound package of bees, together with a good queen, should build up to good strength in six to eight weeks. To do this, of course, the bees must have an abundance of food either coming in from the fields, stored in the hive, or given in a feeder.

Stimulative Feeding in Early Spring.

Question.—How early in the spring is it advisable to start feeding bees to stimulate brood-rearing and what proportion of sugar and water should be used in making the syrup?
Virginia. Clinton H. Shockey.

Answer.—Feeding to stimulate brood-rearing in the spring is not always necessary, for if the bees are well supplied with honey and are able to gather a little nectar and pollen on fine days in the spring, they will rear as much brood as it is safe for them to rear. When spring feeding is necessary it is not advisable to begin feeding until later than is usually thought best. After the colonies have four or five frames of brood, they may safely be fed for stimulative purposes, especially if there is a dearth of nectar at that time. However, if they are supplied with 15 or 20 pounds of honey even this is not often necessary. To make syrup for stimulative feeding use equal parts of sugar and water, either by weight or by measure. It can be mixed without heating.

Examining Bees in the Spring.

Question.—How soon can I open up the hive in the spring to examine the colonies?
Virginia. J. W. Hoopes.

Answer.—The hive can be opened and the bees examined on any warm day this month. In fact, it does no particular harm to open the hives and look in from the top even during the winter, if this is done on a mild day. On the other hand, it is not advisable to handle the bees any more than is necessary until they begin to work freely. Usually it is not necessary to open the hives until late in April or early in May, provided the colonies have an ample supply of honey. In fact, colonies that have an abundance of honey and sufficient room for early brood-rearing need not be examined until just before swarming time or time to put on the supers. Of course, if there is any danger of any of them running short of stores an earlier examination should be made. An abundance of stores is the best way to eliminate spring work in the apiary.

Beginning of Spring Brood-rearing.

Question.—At approximately what date in the spring does the queen begin laying eggs in this region provided the queen is a good one and the bees are in normal condition, being well protected and having plenty of stores?
Ohio. C. G. Meyer & Son.

Answer.—In your locality spring brood-rearing is not begun in earnest until the latter part of March or the first of April, but under some conditions the queen begins to lay a few eggs as early as January. Only small patches of brood are found, however, until late in March or early in April. Strong colonies that are wintering well usually postpone brood-rearing later than weak colonies, colonies that are wintering poorly or colonies that are disturbed or are abnormal in any way. An extreme cold spell sometimes causes more of the bees of a cluster to become active when a queen begins to lay even in the coldest weather. Brood-rearing is postponed until late only when the bees are able to remain quietly clustered in a rather loose cluster. Anything that causes greater activity brings on earlier brood-rearing.

Feeding Back Honeydew Honey in Sections.

Question.—When is the best time to give back to the bees supers of comb honey filled with very dark honeydew honey? Should these supers be put under or on top of the brood-chamber? W. H. Ellis.
Pennsylvania.

Answer.—The best time to put these supers back on the hive will depend upon the character of the spring and the amount of stores the bees already have. Usually the time that spring feeding does the most good is between fruit bloom and clover bloom for your locality; but, if the bees need food earlier, you need not hesitate in giving this honeydew honey earlier. As a rule, it is safer to put the super of honey on top instead of below. Placing it below might bring on robbing in the apiary.

Supplying Bees with Water.

Question.—What will keep bees away from watering-troughs used for watering stock?
New Mexico. C. A. Pendergast.

Answer.—It is not always possible to keep bees away from watering-troughs, but the trouble can be greatly reduced by supplying the bees with a watering place near the apiary. This should be done early in the spring so that the bees will become accustomed to going to their own watering place instead of to the watering-trough used for watering stock. A

good arrangement for supplying bees with water is a large earthenware jar. After filling the jar with water a few handfuls of cork chips, such as used in shipping grapes, should be put on the surface of the water to prevent bees from drowning. By adding a little salt to the water it will stay fresh longer and the bees apparently prefer it.

Bees Injured by Spray Poison.

Question.—Would you please tell me whether the poison used in spraying fruit trees is injurious to bees? Laura Farmer.
Indiana.

Answer.—When fruit trees are sprayed with a mixture containing arsenic while in full bloom many bees are killed by the poison, but if the spray is applied at the right time, but little if any harm is done. The first spray for the control of coddling moths should not be applied until at least 90 per cent of the petals are down, for best results so far as the fruit is concerned. Fortunately for beekeepers, when spraying is done at the right time from the orchardist's point of view there is practically no harm to the bees unless the spray material falls on some flowers in bloom in the cover crop, as sometimes happens in the West.

Tulip Tree as Nectar Yielder.

Question.—How many colonies of bees will it require to gather the nectar from the 800 tulip poplar trees which are within half a mile of my bees? D. F. Barker.
Alabama.

Answer.—It is impossible to state just how many colonies it would take to gather all the nectar from these 800 trees. When the tulip trees are yielding well there is often nearly a teaspoonful of nectar in each flower. Under such conditions probably 200 colonies would not be able to gather all of the nectar, but when it is not yielding so well and during seasons when the bloom is not abundant, 60 or 80 colonies may be enough for best results in your location. This is only an estimate. No one can give definite figures on it.

Transferring to Jumbo Hives.

Question.—I want to change from ten-frame standard hives to Jumbo hives. Should I put the new hive with full sheets of foundation below or above? J. W. Hoopes.
Virginia.

Answer.—The bees will work into the new hive more readily if it is placed on top of the old one. In doing this it is best to lift up one or two combs of brood from below and put them above temporarily. One or two of the standard frames from below can be placed in the middle of the Jumbo hive above until the bees have made a good start there, and the queen has begun to lay in the new combs built on the foundation, when the standard combs should be put back below and a queen-excluder put between the two hive bodies to keep the queen from going down again. After three weeks the brood will all have emerged below except the drone brood when the standard brood-chamber can be removed.

Debris on Bottom-board in Winter.

Question.—What is the yellow stuff that collects on the bottom of the hive in winter?
Ohio. T. Merle Smith.

Answer.—This is chiefly bits of cappings that the bees have torn from the sealed honey as they consumed their stores during the winter. This material contains considerable wax, and some beekeepers make a practice of collecting it when cleaning the bottom-boards in the spring and rendering the wax.

Room Needed for Spring Brood-rearing.

Question.—If each brood-frame is filled full of brood and contains no honey, how many combs of standard size would it take for a good colony to build up to full strength in the spring? A. B. Stowe.
Kansas.

Answer.—A good colony of bees will sometimes have brood in 12 to 16 combs in the spring. If the brood and honey were separate, no doubt all of this brood would be contained in 9 or 10 standard combs. A standard frame when filled with perfect comb contains about 7000 worker-cells. Ten such combs would, therefore, contain 70,000 cells of brood if all were filled at the same time. Only occasionally if ever does a queen lay this many eggs within three weeks. However, it is not best to attempt to crowd all of the brood into the smallest possible number of combs during the spring building-up period, for this may bring on swarming. The usual method is to give all of the strong colonies a second story containing at least one dark comb as soon as more room is needed in the spring, then permitting the queen to lay in the second story for a few weeks and finally putting her back into the lower story which she usually abandons when working in the upper one. In other words, an extracting super is loaned to the queen for a few weeks only at the critical time to prevent swarming, The queen is usually put back into the lower story at about the beginning of the main honey flow or shortly before. The queen should have too much room during the spring building-up period rather than too little. For extracted-honey production, the second story containing the brood may be left on the hive tiered up among the supers and the queen confined to the lower chamber by means of the queen-excluder. For comb-honey production it is necessary to take away all of the brood that will not go into a single story when comb-honey supers are put in place.

A. I. Root's Story of His Own Life

And the men of the city said unto him * * * * * What is sweeter than honey?—Judges 14:18.

(No. 10.)

As my Italians had built queen-cells so readily and almost all of them were so much quieter and easier to handle than my black bees, I concluded to keep them at the business of raising queens. Accordingly I used all the queen-cells and gave them fresh brood to raise more. This time I left them one cell, but strange to say they clung to the young queen and killed her almost as soon as emerged.

I gave them a whole frame of brood to encourage them to keep up their spirits for ten days more. In eight days and twenty hours, according to a memorandum kept at the time, I opened the hive to count my queen-cells and found them all torn open. On looking further I found the largest queen I had ever seen, a young "giantess" as some one expressed it. The bees were then working on the blossoms of the basswood.

"Giantess," a Remarkable Queen Bee.

In a few days more I found that this queen had almost filled the combs with eggs, which hatched in due time. The bees proved to be hybrids. As our fall that year afforded no pasturage, it took nearly all of their honey to raise the brood, and in November they were nearly destitute. I treated them, with the rest of my stock, to 20 pounds of sugar syrup, and did not see my queen again until warm weather in February. Then I found her filling her combs with eggs at a great rate, but some days later noticed quite a quantity of larvae and immature brood in front of the hive. I let it pass, however, thinking that some of the brood had gotten chilled and had been carried out by the bees.

Towards the last of March on opening the hive, I found the bees much dwindled, not a particle of brood and scarcely any honey. I had no Langstroth frame containing any honey, but near by stood an American hive from which a colony had died. I now saw the inconvenience of having two kinds of hives in an apiary. The American hive was nearly full but I could not exchange the frames, so I decided on what seemed a rather risky experiment, as it was pretty cold weather at the time. I put the American hive in place of this Langstroth hive and brushed into the cold hive the bees, "giantess" and all, nearly starved and stupid with cold, picked up those which fell on the ground, tumbled them in and left them do the best they could. But toward evening, feeling some remorse about the rough manner in which I had treated these bees, I ventured to look in upon them and found that they had so far recovered as to remember that they were hybrids and object to any further assistance. Still I managed to get a peep at "giantess" and the preparation the bees had made for housekeeping with the benefit of the plentiful supplies.

After that, as the colony had become quite weak I decided to let them build up as fast as they liked, and when I began to take frames from the rest to raise queens my wife suggested that I should not disturb the one with the large queen but wait and see how strong the colony would get, as she had doubts of my policy regarding artificial swarming.

She Finds a New Home in the Woods.

Towards June the colony seemed pretty strong, but the combs were not yet fully completed and the bees had not clustered out any; yet, for fear the colony might swarm, I did remove a comb from the center. Two days after this, it being necessary for my wife to be away, I requested a neighbor to watch and inform me at the store, which was not far off, if my bees should swarm. Sure enough, about ten o'clock she came in, out of breath, to tell me that the bees had swarmed. Contrary to all known rules and regulations they had not waited to cluster, but had poured out of the hive pellmell as if old Nick himself was after them, hurried up into the air and made off in a northeasterly direction, the largest swarm that had ever been seen, as all agreed.

Of course, it was "giantess" on the rampage. I had been thinking of clipping her wings only that very morning and now she was gone. In despair I set off in the direction indicated, but only succeeded in learning that the bees had been seen to pass over a certain house, perhaps 20 rods from my apiary. Resolving that I would get them if within the bounds of possibility, I returned home to make an examination. I found the hive almost entirely destitute of bees,

but every cell filled with brood and honey; even the frame I had given them, partly filled with empty comb, was full nearly to the bottom and the outside frames solid with sealed honey. But, strange to tell, not a queen-cell in any stage was to be found and scarcely bees enough to build one, as it then seemed.

Another Runaway Swarm.

To digress a little, I may say I always had much trouble with my young queens just before or about the time they began to lay. One in particular I used to expect to find almost every evening clustered with her quart of bees on some neighboring tree in spite of brood, larvae or eggs. Well, just the Sunday morning previous to the event narrated, as I was enjoying the cool air in the garden among my bees, I was surprised to hear faintly the peculiar hum of swarming bees, and just caught sight of my would-be truant nucleus going over the fence. As its queen was a fine one, I started in pursuit, leaving my bee-hat on the way. Over the fences and gardens I went, across several streets, presenting a rather queer sight to the good people on their way to church, and only stopped 20 or 30 rods away at the apiary of a friend who was just hiving a swarm of black bees, with which my minature swarm seemed desirous of forming a partnership. Could my bees have heard the swarm coming out at that distance, or was it merely accidental? I stationed myself at the entrance of the new hive, and, as her majesty made her appearance, I prevailed on her to enter a queen cage and then I carried her back home, a part of her subjects being loyal enough to follow. On the way home I thought of an expedient to make her stay —strange I had not thought of it before —namely, clipping her wings. Accordingly I got the scissors and clipped one wing, but to be doubly sure, I thought I would clip the other wing also. This seemed to cut rather hard, but I succeeded in getting it off, when, behold, I had cut off a foreleg, too, which the queen had thrust between the blades in an attempt to save her wing. She was put back, however, where she stayed—at least temporarily.

Prof. H. D. Hughes of Ames, Iowa, and A. I. Root in animated discussion over Hubam clover at Medina during the summer of 1921.

A few days later, when I found that the deserted hive from which "giantess" had gone, had no queen-cells, I went immediately for the clipped queen, but she too had caught the swarming fever and gone. If she had no wings, she had feet, at least a part of them, and as she could do no better, had gone on foot. By watching the few remaining bees that were around the small hive or box, I actually saw them following her track and I found her nearly half way across the garden, surrounded by her remaining subjects. From the manner in which they followed her trail, I think that she must have left a peculiar scent along the ground she had traversed. She was caged again and given to the bees left in the hive from which "giantess" had gone, and as the bees did not seem hostile at all, I released her after a short time and supposed all was right; but after a week or more, finding them queenless with a large number of queen-cells started, I concluded that either they had killed her, thinking they could raise a better-looking one, or that she had taken another fancy to a pedestrian exploration. My wife suggested that if I had not clipped her wings on Sunday, she might have proved more profitable.

Before starting in pursuit of "giantess" I looked up all my remaining fertile queens and clipped one wing of each. Clipping a leg, too, I decided to be unnecessary.

A Search for the Bee Tree.

It was toward evening, before I started off across the meadows in pursuit of my missing swarm. I had previously examined my books and found that Langstroth had mentioned a similar instance of bees going off without clustering and

that they were found by taking the line on which they were last seen to move. I had found hybrid bees working on clover; but, though I caught a number, they did not seem to care for honey and would not notice it even when I poked their noses into it. They had evidently made up their minds not to be lined. On further consultation with the book I learned that I must wait until forage was not so plentiful. I did so, but as I waited until the white clover was all gone, I could not find any bees to start with, and after several unsuccessful attempts concluded that bee-hunting was not my forte. I was going to abandon the swarm in despair, when in August we discovered Italians at work in a buckwheat field. Bringing the bee-box into requisition I soon had a line in the desired direction, and presently a host of bees were going and coming in a bee line. However, they did not all strike the woods at the same point and after looking in vain at all the trees within a quarter of a mile, I decided to "cross line."

Catching a boxful of bees and carrying them about a quarter of a mile, I let one out to see which way it would go home. After circling around some time it struck off towards the northeast. Thinking I had not come far enough I went another quarter of a mile and let out more bees. They likewise moved northeast. That time I went forward half a mile. Still they went northeast. I went another quarter of a mile, and on letting out the remainder they too settled in a northeasterly direction. My companion, who weighed 240 pounds, declined going further, as he said he was sure the bees had located somewhere on the opposite shore of Lake Erie.

Some of our acquaintances shook their heads, remarking what a crazy fellow that was, chasing after a swarm of bees, they knowing all the time he would never find them. The bees had been advertised in the Gazette when they first went off, so everybody knew about it.

But I was going to have those bees just for spite. I engaged the services of an experienced bee-hunter and prepared anew for the siege. Reinforced with a bottle of oil of anise, according to his direction, I soon had half a swarm at work, and while I amused myself by carrying the bait along in the direction from which the bees came, he went to examine a piece of woods beyond those in which he had been looking. It was not long before I heard the welcome news that he had found them. Sure enough they were in the top of a towering oak, going in and out as much at home as though they had a perfect right to be there. In going from the buckwheat field, they had been compelled to pass a small corner of woods, and as some had gone over it and others around it, it created a confusion in regard to their location.

Cutting the Bee-tree and Transferring the Bees.

The next spring we got the bees down and into a hive notwithstanding doubtful surmises from a host of friends. I had intended to cut the tree in April, as a correspondent advised, but could not get time to do it until the 25th of May. Then I got the transferring tools ready and started about five o'clock in the morning for the scene of operation. "Giantess" had been obliging enough to go two miles with her retinue and take up her abode on property owned by my wife's father. The tree was eased down so carefully upon a couple of small hickories that I could take out almost every comb entire.

After transferring the brood carefully into the hive, I ran the bees in from a place near the opening where they had clustered as conveniently as I could have wished, but there was one serious trouble after all. "Giantess" was not there. In her stead I found a host of large queen-cells, and what was stranger still, at least a half dozen of them were open with the lids attached as nice as could be. Of course, the bees had swarmed. Later I found four promising daughters of "giantess," all in this one hive and on peaceable terms so far as I could discover.

TRADE NOTES.

200 slightly used empty double queen-mating hives, consisting of 10-frame Standard hives, each with tight-fitting division-board, two half-width inner covers, an entrance in each end of hive. All hives with metal roof covers in splendid condition, just what a queen-breeder needs. Your money back if not satisfied. A bargain at $2.60 each.

100 used baby nucleus queen-mating hives, empty, at 75c each.

Prices f. o. b. Medina, Ohio.

THE A. I. ROOT CO., MEDINA, OHIO.

New Catalog Ready
Beekeepers' Supplies

Root's Goods of High Quality. Three-ply foundation, standard stock of supplies kept on hand for prompt shipments. Send us your inquiries and orders early for quick action.

J. NEBEL & SON SUPPLY CO.
Montgomery County. High Hill, Mo

GOLDEN QUEENS AND THREE-BANDED BEES FOR 1924.

1 Untested Queen, $1.00; 1 Tested Queen, $1.50; 1 lb. package of bees, $2.00; 2-lb. package of bees, $3.00; 3-lb. package of bees, $4.50. Nucleus, per frame, $1.50; 1 additional pound of bees with nucleus, $1.00. No disease, safe arrival guaranteed; bees inspected.

J. W. SHERMAN, VALDOSTA, GEORGIA.

Classified Advertisements

Notices will be inserted in these classified columns for 7c per word. You must say you want your advertisement in the classified columns or we will not be responsible for errors. For special conditions on bee and queen advertising please write us. Copy should be received by 15th of preceding month to insure insertion. Cash with copy, if credit has not been established previously.

REGULAR ADVERTISERS DISCONTINUED IN GOOD STANDING.

(Temporary advertisers and advertisers of small lots, when discontinued, are not here listed. It is only regular advertisers of regular lines who are here listed when their advertisements are discontinued when they are in good standing.)

C. N. Ballard, R. C. Wittman, Hoehn & Honigford, Wm. F. Vollmer, Mrs. Alice Burrows, Radloff Bros., Maple Dale Hatchery, J. G. Puett & Son, Hickory Shade Apiary, W. H. Toppin, Jas. W. Houck & Co., Kitselman Bros., Mead Cycle Co., Van's Honey Farms, Reynoldsville Hardware Co., Inland Poultry Journal, O. M. Scott & Sons Co., Loveitt Honey Co., A. J. Heard, Madison Cooper, Woodlawn Nurseries, Condon Bros., D. Hill Nursery Co., R. H. Shumway, Bridgman Nursery Co., The Livingston Seed Co., R. F. Neubert Co., R. M. Kellogg Co., Superior Honey Co., Rhodes Mfg. Co., Whitesbog Blueberry Nurseries, M. H. Hunt & Son, Griggs Bros. Co., gone into receivership.

HONEY AND WAX FOR SALE.

CLOVER-BASSWOOD honey in new 60-lb. cans. Sample 20c. W. B. Crane, McComb, O.

FOR SALE—Fine clover honey, $7.50 per 60-lb. can. Sample 10c. Frank Coyle, Penfield, Ill.

FOR SALE—Fine quality clover honey in 60-lb. cans. Sample, 10c. Geo. M. Sowarby, Cato, N. Y.

FOR SALE—Fine clover honey in new 60-lb. cans. Prices on request. Dr. C. G. Luft, Fremont, Ohio.

FOR SALE—White clover honey, new cans and case, two 60-lb. cans to case, $14.40. J. J. Lewis, Lyons, N. Y.

EXTRACTED honey, two 60-lb. tins, white clover, $14.50; light amber, $13.00. J. G. Burtis, Marietta, N. Y.

FOR SALE—Comb and extracted white clover honey. Prices on request. Dr. E. Kohn & Son, Grover Hill, Ohio.

HONEY FOR SALE—In 60-lb. tins; white clover, 13c; for immediate shipment from New York. Hoffman & Hauck, Woodhaven, N. Y.

FOR SALE—Clover, amber and buckwheat honey in 5-lb. pails and 60-lb. cans. C. J. Baldridge, Homestead Farm, Kendaia, N. Y.

FOR SALE—Choice clover extracted honey in new 60-lb. cans and cases. Also a few cans of amber honey. Write for price stating quantity desired. J. D. Beals, Oto, Iowa.

CHOICE extra-fancy white clover honey in new 60-lb. cans, 120 lbs. net, $14.00. Sample 20c. No. 1 comb honey, $5.50 per case. Edw. A. Winkler, Joliet, Ills., R. F. D. 1.

FOR SALE—White honey in 60-lb. cans, also West Indian in 50-gallon barrels. Samples and prices on request. A. I. Root Co., 16-18 Jay St., New York City.

FOR SALE—Extra-choice white clover honey, case or carload. Sample, 15c. Also about 60 cases choice light amber. David Running, Filion, Mich.

FOR SALE—White clover honey in 60-lb. cans—none finer. J. F. Moore, Tiffin, Ohio.

FOR SALE—One ton clover honey, one and one-half tons light amber, also one ton baker's stock honey. Write for prices. D. R. Townsend, Northstar, Mich.

FOR SALE—A very fine quality of clover honey in new 60-lb. cans and 5-lb. pails. One case or carload. Also buckwheat honey in cans and kegs. H. B. Gable, Romulus, N. Y.

FOR SALE—Comb and extracted white clover honey, extracted in 60-lb. cans, and 5 and 10 lb. pails. Prices given on request. Sample, 15c. F. W. Summerfield, Waterville, Ohio.

FOR SALE—Honey in 60-lb. cans. Sweet clover, basswood, white clover and other flavors. Tell us what you want. Beekeepers who need more honey for their trade and solicitors should write us. A. I. Root Co., 230 West Huron St., Chicago, Ill.

HONEY AND WAX WANTED.

WANTED—Both comb and extracted honey. Name your best price in first letter. M. V. Facey Honey Co., Preston, Minn.

WANTED—A car or less quantity of clover honey in 60-lb. cans. Mail sample and quote lowest cash price for same. A. W. Smith, Birmingham, Mich.

OLD COMBS, cappings or slumgum wanted for rendering by steam press process. We pay cash for wax rendered, trade for supplies or work it into foundation. W. T. Falconer Mfg. Co., Falconer, N. Y.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade price, charging but 5c a pound for wax rendered. The Fred W. Muth Co., Pearl and Walnut Sts., Cincinnati, Ohio.

OLD COMBS WANTED—Our steam wax presses will get every ounce of beeswax out of old combs, cappings or slumgum. Send for our terms and our 1924 catalog. We will buy your share of the wax for cash or will work it into foundation for you. Dadant & Sons, Hamilton, Ill.

FOR SALE.

HONEY LABELS—New design. Catalog free. Eastern Label Co., Clintonville, Conn.

PURE beeswax rendered from cappings, 1923 crop. Winkler Honey Co., Joliet, Ill.

FOR SALE—Tested alsike clover seed, $9.00 bushel. C. J. Baldridge, Kendaia, N. Y.

SELLING 100 8-frame supers, 50 bodies, $150. Hickory Shade Apiary, Otterville, Mo.

FOR SALE—Jumbo standard hives, painted, wired foundation. Bargain. Lewis Huff, Salem, Ind.

ROOT bee supplies and AIRCO foundation for 1924. A. V. Small successor to C. F. Buck, Augusta, Kans.

FOR SALE—Comb and brood foundation mills, perfect condition. Mrs. Effie Stocks, Grinnell, Iowa.

FOR SALE—100 standard dovetailed 8-frame comb honey supers. Very cheap. J. D. Beals, Oto, Iowa.

FOR SALE—One 2½ x 10-inch comb foundation mill. Used but little. T. F. Stone, Route No. 1, Box 98, Jacksboro, Tenn.

FOR SALE—45 empty 8-frame hives, 120 comb-honey supers with fixtures, $75.00. William Davenport, 2111 Noyes, Evanston, Ill.

FOR SALE—Second-hand 60-lb. cans, two cans to case, boxed. Best offer. F. A. Connor, R. F. D. No. 1, Taunton, Mass.

SEND TODAY for samples of latest honey labels. Liberty Pub. Co., Sta. D., Box 4003, Cleveland, Ohio.

CONNECTICUT and Rhode Island headquarters for Root's beekeepers' supplies. A. W. Yates, Hartford, Conn.

FOR SALE—Soiled cane sugar for feeding bees. Get your supply now for spring feeding. Winkler Honey Co., Joliet, Ill., Rt. 1.

FOR SALE—200 bottom-boards, 200 flat wood covers, 10-frame, new last year, 50c each. L. F. Howden, Fillmore, N. Y.

FOR SALE—Self-spacing frames. Brood, 4½c each; shallow, 3½c each. If interested, send for sample. Elmer Gressman, Hamburg, N. Y.

FOR SALE—Guaranteed genuine pure scarified Hubam clover seed. Northern grown. Prices on request. Edw. A. Winkler, R. F. D. No. 1, Joliet, Ill.

FOR SALE—Good second-hand 60-lb. cans, two cans to case boxed, at 60c per case, f. o. b. Cincinnati. Terms cash. C. H. W. Weber & Co., Cincinnati, Ohio.

SOUTHWESTERN distributors for Robinson's comb foundation. Also Italian queens and cypress hives. Send for price list. Holloway Bros., Marietta, Okla.

ADAPTABLE BEEHIVES, single or double walled, are sound in principle and are practical. For free information address Geo. P. Wood, Peekskill, N. Y.

REXFORD Push-in-comb Introducing Cage. Improved. Queen is introduced automatically. It does the business, 35c, three for $1.00. O. S. Rexford, Winsted, Conn.

ATTRACTIVE LOW PRICES—Write us for list of odds and ends, shipping cases, hives, etc., first grade, priced to save you money. Dadant & Sons, Hamilton, Ill.

BLACK RASPBERRIES pay big profits. Easily grown anywhere. Bees sure do like their blossoms. Good plants for sale, reasonable. Frank Payne, Shawnee, Kansas.

ROBINSON'S comb foundation will please the bees and the price will please the beekeeper. Wax worked at lowest rates. E. S. Robinson, Mayville, Chau. Co., N. Y.

HONEY-NUT CHOCOLATES. A new and delicious confection made of pure honey, nuts, fruits, etc. $1.00 lb., 50c ½ lb., postpaid. Wholesale prices on application. J. D. Kroha, 87 North St., Danbury, Conn.

FOR SALE—4 double-walled ten-frame chaff hives, 5 section supers, 4 extractor supers, 1 Root-Cowan extractor, various small appliances, all in good condition. Sold at half price to near purchaser. G. White, 319 Tappan Street, Brookline, Mass., Tel. Regent 0837.

LONESOME? Then get "A DATE WITH YOUR HONEY" and enjoy the evening. HONEY-NUT CHOCOLATES, $1.00 per pound postpaid. Chocolate beehives full of honey and nuts, 2 for 25c or $1.10 per dozen postpaid. Fairmount Apiaries, Schuylkill Haven, Penn.

FOR SALE—100 two-story ten-frame colonies, 1924 Italian queens. Extracting outfit complete with 1918 Ford roadster, in northern California, where crop never fails. Price $1000, $500 down and balance in honey when extracted. Loamland Apiaries, R. F. D. No. 4, Box 92, Chico, Calif.

FOR SALE—100 L. depth 10-frame bodies with drawn combs built on full sheets and wired Hoffman frames, suitable for either brood-combs or extracting, $2.50 per body, one or all. No disease. 50 metal covers with super covers, 70c each. 30 empty shallow extracting supers, 25c each. Cash with order. Porter C. Ward, Elkton, Ky.

FOR SALE—One 4-frame power extractor (new), $75; 60 cases 60-lb. cans, 2 to a case, each, $1.00; 22 cases (empty) for 10-lb. pails, 25c each. Above prices f. o. b. Bayfield, Wis. S. D. Clark.

FOR SALE—1 four-frame gear-drive combination power or hand extractor, 9⅝-inch pockets, $50.00; 1 four-frame friction-drive combination power or hand extractor, 12-inch pockets, $70.00; 1½-H. P. motor, $50.00. All machines as good as new. F. W. Summerfield, Waterville, Ohio.

SPECIAL PRICES—We are offering at specially low prices some very high-grade material in shipping cases, frames, hives and miscellaneous which represent items we no longer carry regularly in stock or which have to be closed out to make room for new stock specially equipped to take Dadant's Wired Foundation. If interested, write for list; we can save you money. Dadant & Sons, Hamilton, Ill.

BEES AND QUEENS.

WHOLE colonies of bees, if advertised for sale in these columns, must be GUARANTEED free from disease, or advertiser must state he will furnish certificate of health from some authorized bee inspector.

HARDY Italian queens, $1.00 each. W. G. Lauver, Middletown, Pa.

SEE E. J. Beridon, Jr. ad before ordering. He has the price and the goods.

WHEN IT'S GOLDEN, IT'S PHELPS! C. W. Phelps & Son, Binghamton, N. Y.

PACKAGE BEES, NUCLEI AND QUEENS. Write for prices. J. J. Scott, Crowville, La.

SEE E. J. Beridon, Jr. ad before ordering. He has the price and the goods.

I WANT to quote you on your queen requirements for coming season. R. V. Stearns, Brady, Texas.

JOHN PROTHERO, Rustburg, Va., is returning to England and will be unable to fill orders for queens.

THREE-BANDED Italian queens, $1.25 each, $12.00 per dozen, after May 15. Curd Walker, Jellico, Tenn.

FOR SALE—Three-banded, leather-colored queen bees. None better. Write for prices. M. Bates, Greenville, Ala., R. F. D. No. 4.

FOR SALE—20 hives Italian bees in excellent condition, guaranteed free from disease. Louis Rausch, Creve Coeur, Missouri.

GOLDEN Italian queens bred by an experienced breeder. Price, $1.25 each; $11.00 per doz. Honoraville Bee Co., Honoraville, Ala.

MY five-banded golden queens will be ready April 1. 1 queen, $1.00; 6 queens, $5.50; 12 queens, $10.00. W. W. Talley, Greenville, Ala., Rt. 4.

FOR SALE—Several colonies of bees in 10-frame Root hives, all guaranteed free from disease. R. J. Whitney, Royal Oak, R. F. D. No. 5, Mich.

FOR SALE—70 colonies Italian bees in good condition. All colonies guaranteed to be free from disease. R. S. Sheldon, New Smyrna, Box 543, Florida.

BRIGHT Italian queens, 1, $1.00; 12, $10.00; 100, $75.00. Write for prices on package bees. T. J. Talley, Greenville, R. F. D. No. 3, Ala.

FOR SALE—Three-band Italian queens and bees for spring delivery. One 3-frame nucleus with one pound extra bees, with untested queen, for $5.00. Write for prices on larger quantities. No disease. Safe delivery and satisfaction guaranteed. J. E Arthur, Register, Ga.

FOR SALE—One to fifty colonies of bees in 10-frame hives, several hundred wood-wire excluders and much other desirable beekeepers' stuff. All colonies guaranteed free from disease. A. W. Smith, Birmingham, Mich.

FOR SALE—30 colonies of Italian bees, Root and Achord strain, eight-frame hives, all colonies guaranteed to be free from disease. $6.00 per colony. Dr. Hugh LeJambre, Bordentown, N. J.

GOLDEN ITALIAN queens for sale. 1, $1.00; 6, $5.00; 12, $10.00; 100, $75.00. Package bees in season, 20 per cent to book your order for spring delivery. J. F. Rogers, Greenville, R. D. 3, Ala.

CERTIFIED ITALIAN BEES—150 full colonies of this fine strain of leather-colored stock will be sold as usual to make room for necessary increase. Charles Stewart, Johnstown, Box 42, N. Y.

BEES—Three-pound packages, three-frame nuclei and three-frame nuclei with two and one-half pounds extra bees. April and May delivery. None better. Address Running Apiaries, Sumterville, Ala.

HAVING decided to run our apiaries exclusively for the production of honey, we will not have any bees for sale this season. Thanking all for past business. M. L. Nisbet & Bro., Bainbridge, Ga.

FOR SALE—Three-banded Italian bees and queens. Two-pound package bees with select untested queen, $4.25. One select untested queen, $1.00; one select tested queen, $1.50. J. Allen, Catherine, Alabama.

SPECIAL OFFER, BEEKEEPERS—One frame nucleus with three extra pounds of bees, $2.95. Queens, $1.00. Safe delivery, satisfaction and health certificate guaranteed. 20 per cent with order. M. Voinche, Bunkie, La.

PRICES right. Pinard's queens and package bees. Quality, satisfaction guaranteed. Young, laying, untested queen, $1.25. Two-pound package bees, $3.50. For larger lots write. Circular free. A. J. Pinard, Morgan Hill, Calif.

QUEENS ready about May 10 to give prompt service. Golden Italian, untested, $1.05; 6, $5.50; 12 or more, 80c each; tested, $2.00 each. Safe arrival. Government inspected. Hazel V. Bonkemeyer, R. F. D. No. 2, Randleman, N. C.

THREE-BANDED bees and queens, government inspected. 2-lb. package with select queen, $5.00; select tested queens, $2.50; untested, $1.00 each or $10.00 per dozen. Carolina Bee Co., W. O. Curtis, Mgr., Rt. No. 1, Graham, N. C.

FOR SALE—75 colonies of Root three-banded Italian bees in ten-frame hive, guaranteed free from disease. All new in 1923. 75% of Three-ply foundation, painted. Price, wood top, $12.00; metal top, $13.00, double-walled, $15.00. John Nussbaum, Eckman, N. Dak.

ITALIAN QUEENS, 1 to 5, $1.00 each; 6, $5.50; 12, $10.50; 1 lb. bees with queen, $3.00; 2 lbs. bees with queen, $5.00; 3 lbs. bees with queen, $7.00. We pay delivery charges up to Zone 6. Graydon Bros., Greenville, R. F. D. No. 4, Ala.

GOLDEN Italian Queens for 1924. The big bright hustling kind. Satisfied customers all over the U. S. Untested, $1.00 each; 6 for $5.00; 12 for $10.00; 100, $75.00; tested, $1.75. A few 2-frame nuclei at $4.50 with queen. E. F. Day, Honoraville, Ala.

FOR SALE—50 colonies of Italian bees in 10-frame Langstroth hives, frames, metal-spaced and wired, winter cases and Doolittle feeders included. All colonies guaranteed free from disease. Reason for selling, a surplus of bees. R. C. Hugentobler, Miamitown, Ohio.

FOR SALE—Bright Italian queen, $1.00; 6, $5.00; 1-lb. package bees with queen, $3.00; 2-lb. package with queen, $4.50. Powell Owen, Greenville, Ala.

FOR SALE—350 stands of bees, all guaranteed free from disease. Good location. Extracted equipment. A sacrifice. Oregon Apiary Co., Nyssa, Oregon.

A FEW colonies of Italians guaranteed free from disease again for sale this spring, in ten-frame hives. A. W. Lindsay, 438 Mt. Vernon Ave., Detroit, Mich.

NORTHERN BEES PAY. Fresh, active bees, less express. 2 lbs. with select queen on frame of foundation, $5.75. May delivery. Scott Apiaries, La Grange, Ind.

FOR SALE—About 150 colonies of Italian bees in ten-frame hives, guaranteed free from disease. Also large lot of supplies, mostly new. Locations if wanted. R. L. Tucker, Uniontown, Alabama.

BUY your packages and nuclei WITH QUEENS INTRODUCED and avoid loss. Best pure mated Italian queens, guaranteed. State inspected. No disease. A. O. Smith, Mt. Vernon, Ind.

I BELIEVE my circular and price list will convince you that you should send me that bee and queen order. Just let me know you want one and it is coming. R. V. Stearns, Brady, Texas.

20 to 40 per cent discount on package bees to be shipped between May 15 and 25. Write for prices and particulars. Free of disease, good service and satisfaction guaranteed. Tupelo Apiaries, J. L. Morgan, Apalachicola, Fla.

DIXIE MAID Bright Italian Queens. Select untested, $1.25 each, $12.50 per doz. Untested, $1.00 each, $11.00 per doz. 2-lb. package, $5.00. Write for special prices on large orders. P. B. Skinner, Greenville, Ala.

BOOKING orders now for three-banded Italian queens that satisfy our customers. Satisfaction guaranteed. Untested, $1.00; 25 or more, 90c. Tested, $2.00; 25 or more, $1.75. Rule Brothers, Terlton, R. F. D. No. 1, Box 30, Okla.

FOR SALE—Golden Italian queens, untested, $1.00; 6 for $5.40; 12 or more, 80c each; tested, $1.50 each; select tested, $2.50 each. Write for price on large quantity. No disease of any kind. Safe arrival and satisfaction guaranteed. Sam Hinshaw, Randleman, N. C.

HIGH-PRODUCING BEES AND QUEENS—We can still accept a few more orders for package bees and queens for spring shipment. Place your order now. We ship 2-lb. packages only. Safe arrival and satisfaction guaranteed. Write for circular and price list. J. M. Cutts & Son, R. D. 1, Montgomery, Ala.

BUY ITALIAN bees from shipper farthest north. Get hardy stock and save expressage. Satisfaction guaranteed. 20 years' experience. Three-frame nuclei and tested queen, $5.00; select tested, $6.00. Orders booked for spring delivery by S. G. Crocker, Jr., Roland Park, Baltimore, Md.

LATHAM'S "SHE-SUITS-ME" queens are three-banders of highest quality. Untested, in May, $2.00 per queen. After June 1, $1.00 per queen. Special price on 50 or more. Eastern beekeepers and Canadians will do well to try out my package bees and nuclei. Circular on request. Allen Latham, Norwichtown, Conn.

FOR SALE—Carload of bees, also nuclei and pound packages of hustling three-band Italians. 3-frame nuclei, with queen, $5.00 each; 2-frame nuclei, with queen, $3.75 each; 3-pound package with queen, $5.00; 2-pound package, with queen, $3.75; 1 queen, $1.00; 12 queens, $11.00. Orders booked free. W. E. Buckner, Mt. Vernon, Ga.

FOR SALE—150 colonies, guaranteed free from disease, in fine new hives, drawn combs. Entire outfit cheap. O. L. Rothwell, Gillett, Pa.

ITALIAN QUEENS—Three-banded, bright and leather-colored. Satisfaction guaranteed. Write for prices, etc. A. T. Keil, Treesdale Farms, Mars, Butler County, Penn.

MUST sell large equipped apiary in tupelo honey section of Florida. Bees guaranteed free from disease. 22 acres fertile land. Price $1500. Wm. Keiter, Cherrydale, Va.

GOLDEN ITALIAN queens, producing large beautiful bees, solid yellow to tip. Package bees, nuclei circular, 1924, ready free. Dr. White Bee Co., Sandia, Texas.

FOR SALE—One to seventy-five colonies Italian bees in ten-frame hives with metal covers, full sheets wired foundation. Hives like new. Bees guaranteed free from disease. $10.00 per colony. Bert Gander, Bayard, Iowa.

ITALIAN nuclei and queens, three-banded only, two-frame nucleus with queen, $4.00, and you get a real nucleus, one that brings results. Try them and see how quickly you have a full colony. May delivery. Select untested queens, $1.00 each. No sugar feeding. They are honey queens and will stand a test with any. H. S. Ostrander, Mellenville, N. Y.

SPECIAL two pounds Italian bees shipped on frame emerging brood and honey, queen introduced and laying, $4.75 each. Ask for prices regular packages and nuclei. Select untested bright Italian queens, $1.00. Health certificate with all orders. Safe arrival, good service and satisfaction guaranteed. Tupelo Apiaries, J. L. Morgan, Apalachicola, Florida.

GOLDEN Italian queens, untested, about May 1, $1.00; 6 for $5.40; 12 or more, 80c each; tested, $1.50; select tested, $2.50. I can mail tested and select tested of last fall's rearing as soon as the weather will permit. No disease. Good queens. Safe arrival and satisfaction guaranteed. D. T. Gaster, Randleman, R. F. D. No. 2, N. C.

SEVERAL hundred 2-pound packages bees in lots of 25 or more, $3.25 each, few hundred 4-pound packages in lots of 25 or more, $5.00 each. Each package includes a three-banded selected untested queen and a frame of honey and brood, the natural feed for transit. Queens are introduced if wanted. 10 per cent books your order. C. A. Mayeux, Hamburg, La.

PACKAGE BEES FOR 1924—Yancey hustlers; they get the honey. Three-band strain only. Now booking orders for spring delivery. Place your order early and make sure of shipping date; 10 per cent will book your order. We do not book more orders than we can fill promptly. Safe arrival and satisfaction guaranteed on every package and queen shipped. Caney Valley Apiaries, Yancey Bros., owners, Bay City, Texas.

PACKAGE BEES and ITALIAN or CARNIOLAN QUEENS. I save you express charges on northern shipments from my yards near Redding, Cal. (most northern point in California where EARLY PACKAGE BEES and QUEENS can be reared). Eastern and northern shipments via Ogden, Utah, are shipped from San Jose. Untested queens, $1.00; bees, $1.50 per pound. Attractive prices on large orders. J. E. Wing, San Jose, Calif.

GET your queens from an outfit that never has had any brood disease. I was queen-breeder for W. D. Achord the past three years. Have the best three-banded Italian stock obtainable. Prices till May 15, 1, $1.25; 10, $10.50; 25, $25.00; 50, $45.00. 20 per cent reserves shipping date. I do my own work and know how. Pure mating and satisfaction guaranteed or money promptly refunded. Special prices on large orders. W. E. Streetman, Reynolds, Ga.

PHELPS' GOLDEN QUEENS will please you. BEAUTIFUL, GENTLE and PROLIFIC. $2.00 each for June delivery. For July and August, $1.50 each; 6 for $8.00; $15.00 a dozen. C. W. Phelps & Son, 3 Wilcox St., Binghamton, N. Y.

PACKAGE BEES and QUEENS. DELIVERED—Bright Italians, 2-lb. packages, with selected queen: 1-5, $4.75; 5-25, $4.60; 25-50, $4.40; 50 or more, $4.25. Queens, selected, untested, 1, $1.00; 12, $10.00. Safe arrival and satisfaction guaranteed. No disease. Ship nothing but the best. 20 per cent cash books order. Begin shipping April 15. W. C. Smith & Co., Calhoun, Ala.

PACKAGES and nuclei with selected untested Honey Girl queens; 3-lb. bees with queen shipped with stores on comb, $4.50; 10 or more packages, $4.00 each; 3-frame nucleus with queen, $5.00; 10 or more nuclei, $4.50 each; 5-pound swarms with queen with comb, $6.00 each; 4-frame nuclei with queen, $5.75 each. All combs first class in Root-Hoffman frames built on full sheets foundation and wired. Safe arrival, no diseases. Claims for damaged bees replaced immediately on receipt of express bad-order receipt signed by express agent. Certificate of inspection with each shipment. Advise your nearest open express station. Prices are for shipments to points in U. S. and Canada, f. o. b. our shipping point. Orders booked in rotation. White Clover Farm & Apiary, Hamburg, La.

QUEENS AND PACKAGE BEES—For years we have been shipping thousands of pounds of bees all over the U. S. A. and Canada. We have several thousand colonies to draw from. Can take care of your order, no matter how small and up to carloads if you make arrangements in time. Safe arrival guaranteed. Our hundreds of testimonials from beekeepers all over the country speak for themselves in regard to our stock and service. Untested queens, 70c each by the 100; 85c each in lots of 25 or more; less than 25, $1.00 each. Two-pound package, $3.60 each in lots of 25 or more; less than that, $3.75 each. Three-pound package, $5.00 each in lots of 25; less than that, $5.25 each. Add price of queen wanted. Italians, Carniolans and Goldens. We have the best shipping cage made with the liquid washer feeder. Ault Bee Company, 612 Houston Bldg., San Antonio, Texas.

MISCELLANEOUS.

THE BEE WORLD—The leading bee journal in Britain and the only international bee-review in existence. It is read, re-read and treasured. Will it not appeal to you? Specimen copy free from the publishers. The Apis Club, Benson, Oxon, England. Send us a postcard today. It is well worth your little trouble.

GLADIOLI are easily grown. If you have a roadside stand, increase your profits and pleasure by selling flowers as well as honey. 20 gladiolus bulbs, each a different variety, $1.00, postpaid. Send for our wholesale and retail lists. Gelser Bros., Box 4, Dalton, N. Y.

ONE 120-egg "Mandy Lee" hot-air incubator, one 180-egg "Wisconsin," one Planet, Jr., seeder with all attachments, one 3-gal. brass sprayer, to exchange for bees and bee equipment. R. F. Pratt, Cuyahoga Falls, R. F. D. No. 11, Ohio.

GLADIOLI. Grand mixture. Many fine named varieties. All colors. Large blooming bulbs, 100, $2.50; 50, $1.50; 25, $1.00. Bulblets, some bloom the first season, 1000, 75c; 500, 50c; 100, 25c. Prepaid. Riverside Gladiola Gardens, Berne, Indiana.

HELP WANTED.

WANTED—Clean, sober, industrious young man to work in our 700-colony bee business. State age, weight and wages in first letter. Harry W. Beaver, Troy, Pa.

WANTED—Clean, active, young man wishing experience in commercial honey production, in apiaries of over 300 colonies, beginning April 1. Give full particulars. G. L. Edmondson, Brantford, R. D. No. 5, Ont.

WANTED, able-bodied man not over 50 years old, married or single, with some capital to work here in the production of extracted and comb honey, one of the best locations in Michigan for comb honey production. O. H. Townsend, Otsego, R. F. D. 2, Mich.

Gray Carniolans

are hardy, gentle, extremely prolific and as honey-gatherers are unexcelled. Highly disease-resistant, winter admirably and build up very quickly in the spring. We are breeding from the finest American-bred stock in the U. S. as well as from selected breeding mothers imported in 1923 direct from Carniola.

WRITE for my free 8-page circular which gives you every detail relative to this wonderful bee. It is the most complete treatise ever written on the subject. Write for it today.

W. A. HOLMBERG, DENAIR, CALIFORNIA.

4% BANKING BY MAIL

THE HOME OF THE HONEY-BEE

MANY of our customers live some distance from Medina, and find it just as safe and convenient to bank with us by mail as if they visited the bank in person. An inquiry will not obligate you.

Capital, Surplus and Undivided Profits—more than $130,000.00

THE SAVINGS DEPOSIT BANK CO. MEDINA OHIO

A. T. SPITZER PRES. E. P. ROOT VICE PRES. E. B. SPITZER CASHIER

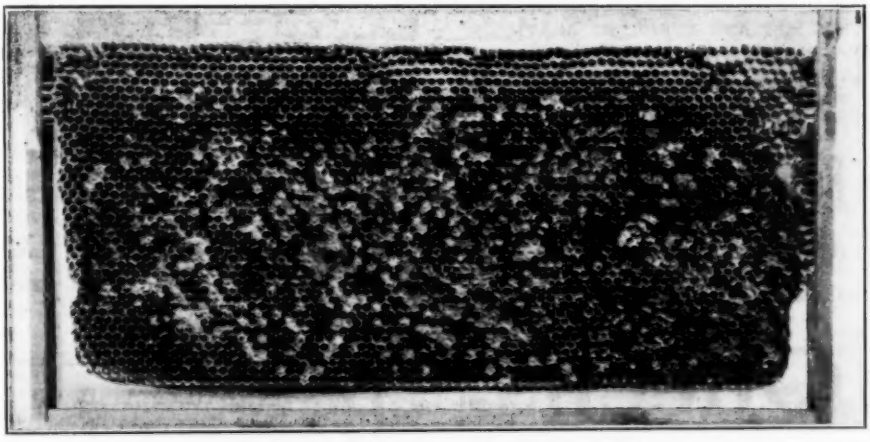
Thagard's Italian Queens BRED FOR QUALITY

UNTESTED QUEEN, $1.00; 12 AND UP, 85c EACH.
2-LB. PACKAGE BEES WITH UNT. QUEEN, $4.00.

Circular free.

THE V. R. THAGARD COMPANY, Greenville, Alabama.

WHAT HUTZELMAN'S SOLUTION WILL DO



Brood-comb Diseased with American Foul Brood.

It will disinfect all sealed brood-cells. It will disinfect cells filled with pollen. It will penetrate all propolis on frames. It will completely disinfect all diseased larvae so that these are no longer repulsive to bees. It will disinfect and easily remove scales of dead larvae from cell walls. Order from your dealer and save much of the freight charge.

PATENTS PENDING J. C. HUTZELMAN, GLENDALE, OHIO WRITE FOR FULL INFORMATION

PLEASE TAKE NOTICE

Out of 33 queens sold during May, 1923, we just received the records. The poorest queen produced a surplus of 240 lbs. of honey; the highest, 456 lbs., and this was from a small colony which had been queenless for several days. Eleven out of the 33 queens produced over 400 lbs. of surplus and records are as follows: 456, 453, 446, 439, 432, 427, 421, 412, 409, 409, 403. The poorest queens show that only five out of 33 queens produced less than 300 lbs. surplus; 17 queens produced between 300 and 400 lbs. These queens have been line-bred since 1885.

Mr. H. E. Crowther from Jefferson, Ohio, writes: "Your queens are sure wonders and need advertising. A queen purchased of you lately beat all the rest in a yard of 60, filling 3 deep supers. A record like the above in a season like 1923 is sure a world's record; and the queens did not have built sections to start with, and did not receive a bit of help from feeding."

Our new method of queen-rearing is sure a wonder. Untested queens, $1. Write us for prices on large orders and breeders.

THE F. M. RUSSELL CO.
Established 1900. Roxbury, Ohio.

NOTICE OF REMOVAL

On and after March 1st, I shall be located in my new warehouse at 237 Park St., Medford, where I shall continue to carry a full line of supplies for the beekeeper. 1924 catalog on request.

H. H. JEPSON
237 Park St. Medford, 55 Mass.
(Formerly at 182 Friend St., Boston.)

MASON BEE SUPPLY COMPANY,
Mechanic Falls, Maine.

From 1897 to 1923 the Northeastern Branch of The A. I. Root Company.
PROMPT AND EFFICIENT SERVICE.
Because—Only Root's Goods are sold.
It is a business with us—not a side line.
Eight mails daily—Two lines of railway.
If you have not received 1924 catalog send name at once.

Root Quality Supplies

East St. Louis, Ill.
O. G. RAWSON, 3208 Forest Place.
Send for Catalog.
Authorized Distributor for St. Louis district.
BEES AND QUEENS.

Queens

$1.00 EACH. $9.00 A DOZEN.
Pure Three-Banded Italians Guaranteed.
THE MERRILL APIARIES, PIEDMONT, S. C.

ALUMINUM CHICK FEEDER for FEED, GRIT, MILK or WATER. Simple, safe and sanitary. Chicks cannot get feet into contents. Send 30c cash or stamps for one postpaid. Money back if not satisfied. **30c**
American Poultry Journal, 460-523 Plymouth Ct., Chicago

Talking Queens

LAWS' LIGHT THREE-BANDED ITALIANS, IN TERMS OF STRONG COLONIES,

Tell the World

Their real value. Thirty-six years' advertising has spread Laws' queens over all the U. S. Millions of pounds of honey are sold annually, the product of Laws' queens. Better get your order booked early; you will then get what you want, and when you want it.

PRICES.

Untested, each, $1; 12 for $10; 100 for $80.
Tested, each, $1.50; 12 for $15; 100 for $100.
Breeding queens, none better, each $5.00.
Breeders guaranteed for at least one season's service.

REMEMBER THE NEW ADDRESS.

W. H. LAWS

BOX 425. WHARTON, TEXAS.

GET THE BEST

Pure 3-band Italian stock, a continuous honey flow from March to December, with 29 years' experience in rearing queens enable me to rear the best to be had. Untested: 1, $1.25; 6, $6.50; 12 or more, $1.00 each. 20 per cent books orders. H. D. MURRY, Magnet, Texas.

THREE-BANDED ITALIAN QUEENS

Guaranteed to give satisfaction; if mismated, replace free of charge.
Untested Queens—1, $1.00; 12, $11.00; 100 $90.00. Select Untested—1, $1.20; 12, $13.00; 100, $100.00. Tested—$1.50. Breeders, $5.00.
H. L. MURRY, SOSO, MISSISSIPPI.

BOOKED to capacity on orders for my Three-Banded Italian Bees and Queens; no more orders will be accepted for this season.

R. S. KNIGHT
R. F. D. 2. New Orleans, La.

(Continued from page 245.)

"There are 800,000 beekeepers in the United States, or at least that many are on record. No doubt there are two or three times that many that are actually interested in the solution of one or more problems connected with their industry, but very few beekeepers indeed have become interested in the development of the American Honey Producers' League.

"This North American organization was founded to protect the beekeeping interests and to develop the industry. That the League has rendered real service cannot be denied. There are enough specific cases on record to show that many members have experienced untold benefits from their membership fee of one dollar. Too many people complain of the lack of service, when in reality the service is there and can be had for only the asking. Far too often beekeepare involved in legal disputes. Think of the value of League counsel which can be obtained by members of the League from one of the leading authorities on law in the United States. The Bureau of Legal Aid is soon to issue a book covering every reference to court action as it pertains to the beekeeping interests. This book will be available to members of the League at a very nominal price.

"Very many beekeepers are interested in the marketing problems. The League is in constant touch with marketing demands and a letter to the Secretary will bring information worth many times the annual membership fee. The trade-mark which has been developed by the League is going to become a factor in disposing of honey in the United States. For those who are interested in advertising honey in any way in their local community or on state-wide basis, they can secure information through the League from experts in that line.

"Membership in the League is open to all beekeepers in North America, and anyone can obtain full membership rights by remitting one dollar to the secretary, S. B. Fracker, Madison, Wis."

(Continued from page 204.)

bags Cuba, 12 bags Porto Rico, 8 bags Chile and 60 bbls. bleached Holland arrived. Demand good, market strong. Per lb., Chile, light, few sales, 31c. West Indies, light 29-30c; dark, 24-25c. Italy, light, few sales, 27c. Africa, dark, 24-26c.

H. C. TAYLOR.
Chief of Bureau of Markets.

Special Foreign Quotation.

LIVERPOOL.—At last we have got a move on and we are able to report some advance in the honey market, due, no doubt, in a great measure to the advance which has taken place in the world's sugar market and to the scarcity of supplies of honey as we get near to the end of the last crop. During the past month there have been about 835 packages sold, the price in American money being about 9½c per pound. The beeswax market is firm, and prices have advanced, being about 283/4c per pound. Taylor & Co.

Liverpool, Eng., March 6.

The A. I. Root Company's Report.

Since our last report, we have purchased only a few small lots of extracted white clover honey at 9½c per lb., f. o. b. shipping point.

STATEMENT OF OWNERSHIP, MANAGEMENT,CIRCULATION, ETC., OF GLEANINGS IN BEE CULTURE, PUBLISHED MONTHLY AT MEDINA, OHIO, REQUIRED BY THE ACT OF AUGUST 24, 1912.

Editors, Geo. S. Demuth and E. R. Root, Medina, Ohio; Managing Editor, H. G. Rowe, Medina, Ohio; Publishers, The A. I. Root Company, Medina, Ohio. Stockholders holding 1 per cent or more stock, as follows: Calvert, J. T.; Calvert, Maude R.; Calvert, Howard R.; H. H. Root, Trustee of A. I. Root Estate; Root, E. R.; Root, H. H.; Root, Mabel K.; Trustees of Employees Profit Sharing Fund.

H. G. ROWE, Managing Editor.

Sworn to and subscribed before me this 22d day of March, 1924.

H. C. WEST, Notary Public.

GOLDEN ITALIAN QUEENS

1 Untested Queen.....$1.00
1 Tested Queen.....$2.00

Satisfaction guaranteed.
Queens ready by June 1.

J. F. MICHAEL

R. F. D. 1. WINCHESTER, IND

HIVE MOISTURE

Its cause and elimination, clearly explained in

CONSTRUCTIVE BEEKEEPING
By Ed. H. Clark.

Price 50c.
491 East Belvidere St., St. Paul, Minn.

TOO LATE FOR CLASSIFICATION.

WANTED—Position with beekeepers. Some experience. J. G. Carlberg, 2307 N. Fremont Ave., Minneapolis, Minn.

WANTED—Man with some experience to work with bees. State experience and wages desired. J. B. & Chas. Merwin, Prattsville, N. Y.

FOR SALE—100 first-class colonies of Italian bees, young queens, in modern 10-frame hives. Willing to furnish each buyer a certificate of health from the State Bee Inspection Department. W. A. Hunter, 1609 S. 5th St., Terre Haute, Ind.

FOR SALE—¾-acre lot Vina, California (near Chico), 5-room house, garage, chicken house, 20 bearing apricot trees, outfit for 35 stands of bees. Ideal location for bees and poultry. If tired of cold climate conditions, investigate this. Family reasons entirely for selling. L. Drabek, Vina, Calif.

Italian Queens

FOR APRIL DELIVERY

Three-bands that hustle. Goldens that will please you. $1.00 each; $11.50 per doz. Clipped free when requested. Prompt and fair dealings assured. Orders solicited. No regret will follow.

CRENSHAW COUNTY APIARY
Rutledge, Alabama, U. S. A.

CARNIOLANS

come through the winter strong in bees and vitality but little diminished if provided with plenty of good stores and well protected, and they build up rapidly during the changing weather of the spring months—two necessary conditions for successful honey production. Have your bees wintered satisfactorily? If not, try some Carniolans this season. Ask for my **free paper, "MERITS OF THE CARNIOLAN BEE,"** for further information about this race, suggestions on management, etc. Later we can supply queens and bees of our own strain of Carniolans—12 years' selection and breeding; **JAN STRGAR, CARNIOLA, EUROPE**, strain. Breeders imported 1923. **ITALIAN**, Hamilton strain; the mother of this breeder produced 577 finished sections of comb honey.

ALBERT G. HANN, Glen Gardner, N. J.

North Carolina Bred
Italian Queens

I am booking orders now for my Root and Miller strain of three-banded Italian queens. They are gentle and good honey-gatherers. From May 1 until July 1: Untested, $1.25 each, or $12.50 per dozen. Tested, $1.75 each, and selected tested, $2.75 each. Safe arrival and satisfaction guaranteed.

L. PARKER, BENSON, N. C.
R. F. D. NO. 2.

Mott's Northern-Bred Queens

Select Untested till June 1; $1.25 each; $1.00 each thereafter. Select, guaranteed pure mated, $1.25 each. Select Tested, $2.00. Virgins, 50c. 1 and 2 pound packages in June. 172 miles east of Windsor, Ontario. Save two days' trip from the far south.

E. E. MOTT, Glenwood, Mich.

SEASON OF 1924

THE SOUTHERN BEE FARMS APIARIES

The Home of the Good Italian Queen.

MARKSVILLE, LA.

Will be ready for shipment May 5.

PRICES

QUEENS—THREE-BANDED ITALIANS

1 mated, untested, $1.00; 6 mated, untested, $5.50; 12 to 25, at 85c each; 25 to 100 at 75c each.

PACKAGE BEES

One package with queen, 2 lbs., $3.00; one package with queen, 3 lbs., $4.00; one package with queen, 4 lbs., $5.00.

Large orders for queens or packages will be given special attention.

Terms: 25 per cent with order, balance 20 days before shipment. Address

JOHN ST. ROMAIN
MARKSVILLE, LA.

Townsend's Bulletin No. 12

I still have a good stock of those fine "line bred," for a third of a century, SHAW breeding queens, also select tested queens ready for May delivery. Note that I'm not offering queens for delivery LATER than May delivery, as I go to my home in Michigan June 1st, and no arrangements are made to furnish queens during the balance of the season, and those intending to put in breeders for this season's use should order May delivery. I quote as follows:

XXX Very select for breeding purposes.. ..... $10.00 each
XX Select for breeding purposes... 9.00 each
X Very select tested..... 3.00 each

Mailed in large export cages. Safe delivery guaranteed.

Package Bees with Queens.

Package bees are worth much more shipped on a regular L. comb of hatching bees and honey to last them during transit than by any other mode of delivery. Safe delivery guaranteed. Health certificate with each shipment. I do not buy bees of any breeder who ever had disease in his yards. I quote as follows for April 20 to May 31 delivery:

25 2-lb. pkgs. with untested queens for $92.50
50 2-lb. pkgs. with untested queens for 172.50
100 2-lb. pkgs. with untested queens for 320.00
25 3-lb. pkgs. with untested queens for 115.00
50 3-lb. pkgs. with untested queens for 217.50
100 3-lb. pkgs. with untested queens for 410.00
25 4-lb. pkgs. with untested queens for 137.50
50 4-lb. pkgs. with untested queens for 262.50
100 4-lb. pkgs. with untested queens for 500.00

Send part payment on bees with order, balance when wanted shipped.

Address with remittance E. D. Townsend, successor to J. W. K. SHAW & CO., Loreauville, La.

KILLS THE WEEDS MULCHES SOIL IN ONE OPERATION

HERE'S the machine that thousands of practical gardeners use. Does the finest work, and is much easier and faster than any other tool.

BARKER Weeder, Mulcher and Cultivator

Eight revolving blades working in combination with the underground knife destroy the weeds and **in the same operation** chop the crusted surface into a **level, moisture-retaining mulch.** Intensive cultivation. "Best Weed Killer Ever Used." Cuts runners. A boy can use it, and do more and better work than 10 men with hoes. Has leaf guards; also shovels for deeper cultivation. Inexpensive. A postcard to us brings you full particulars, Book and our Factory-to-User offer.

BARKER MFG. CO.,
Box 229 David City, Nebr.

FREE BOOK contains information of value to every gardener, describes the BARKER, tells what users say, gives prices delivered, etc.

WRITE TODAY FOR BOOKLET FREE

450,000 TREES.

200 varieties. Also Grapes, Small Fruits, etc. Best rooted stock. Genuine. Cheap. 2 sample Grape-Vines mailed for 20c. Catalog free. West Hill Nurseries, Inc., Box O, Fredonia, N.Y.

ROOT QUALITY
BEEKEEPERS' SUPPLIES

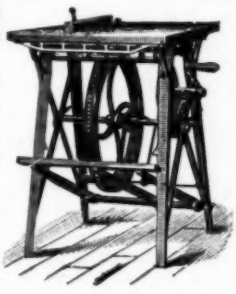
My spring stock is in and I can give prompt shipment; do not wait until the bees need them and can not get them in time for the honey flow. Beeswax wanted.

A. M. MOORE, ZANESVILLE, OHIO.
20½ South Third Street.

BARNES' HAND & FOOT POWER MACHINERY

This cut represents our combined circular saw which is made for beekeepers' use in the construction of their hives, sections, etc.

Machines on Trial. Send for illustrated catalog and prices.



W.F. & John Barnes Co.
545 Ruby Street
ROCKFORD, ILL.

Getting the Honey That Foul Brood Steals!

CLAUDE ELDRED DISCOVERS THAT FOUL BROOD COLONIES DON'T EVEN PAY OVERHEAD!

"Believe me, when a colony drops from 100,000 to 25,000 there's no profit left!"

"I ought to say right here at first, that everything finally turned out all right," Claude Eldred told us, "but for one or two seasons it was mighty discouraging to know that most of my colonies weren't even paying overhead.

"Colonies that should have produced 100,000 worker bees were cut down by foul brood to where the honey didn't pay for my time. It was just simply sickening. Then my state inspector told me one day last spring about the wonderful results beekeepers were getting with Be-Helth, the special sodium hypochlorite disinfectant. I found that it was just the thing I needed to disinfect extractor frames infected with A. F. B. And just as important, I found that, by a simple process of feeding B-H, two or three colonies which were showing signs of E. F. B. could be stimulated to clean up. It wasn't long till every colony in my apiary was up to production.

"I certainly take every opportunity I can to recommend Be-Helth to all beekeepers I meet."

AN EXPERIMENT WORTH TRYING!

There's no mystery at all in what Mr. Eldred did. He simply followed the easy directions. And there was no risk in his trial because Be-Helth has, behind it, a MONEY-BACK GUARANTEE on every package.

FOR BOTH E. F. B. AND A. F. B.

B-H is a clean, clear hypochlorite made particularly for F. B. It contains no poison, acid or oil. Its use where sale honey is produced does not violate the state and federal laws which prohibit use of poisons where food is produced. It is ideal for dry extractor frames which contain A. F. B. spores. Remarkable results have also been obtained by feeding Be-Helth to colonies infected with E. F. B. It gives excellent results in keeping colonies healthy and stimulates bees to clean up.

MAIL THIS COUPON NOW!

General Laboratories, Dept. 6B,
Madison, Wis.

Enclosed is my check for $3.00. Please send me 1 gal. of Be-Helth subject to your MONEY-BACK GUARANTEE and with full directions for use.

Name .....

Address .....

Jensen's Famous Bees and Queens

Queens famous for their wonderful vitality and prolificness. Bees for their honey-gathering qualities, gentleness and uniformity of markings. Northern beekeepers report wonderful results from our package nuclei and colonies of their own bees headed by our queens. There's a reason. We have reared queens commercially a long time. Our methods insure the utmost queen value, regardless of price. If your location affords the pasture, our bees and queens will assure you of a bounteous harvest. We do not claim they will make honey where none is available. Repeat orders booked indicate "THEY DO SATISFY."

No combless package that has come to our attention can be any lighter weight, stronger in construction, afford more ease of handling even by the amateur. Quick and automatic. Will ship on sugar syrup unless you specify candy.

PRICES.

2-lb. package with untested queen, $4.25; 12 up, $4.00.
3-lb. package with untested queen, $5.25; 12 up, $5.00.
2-frame nuclei, young queen introduced, $4.25; 12 up, $4.00.
3-frame, young queen introduced, $5.25; 12 up, $5.00.
Untested queens: $1.00 each; $11.00 per doz.; $80.00 per 100.
Select untested: $1.20 each; $13.00 per doz. Tested, $1.50 each. Breeders, $5.00.
10 per cent to book. Balance just prior to shipment. Guarantee: Pure mating of queens, freedom from disease and safe arrival of everything we ship. Yours for a square deal.

Jensen's Apiaries, Crawford, Miss.

Queens

The season is near when you will be in the market for queens, and I shall be pleased to supply you. I endeavor each year to produce queens just a little better than I did the year previous, to improve my stock a little and render just a little better service. I feel that for the season of 1924 I have several advanced features that will benefit my customers. A card will bring our literature.

QUEEN PRICES.

Before July 1.

1 to 4.....$2.00 each
5 to 9..... 1.95 each
10 or more. 1.90 each

After July 1.

1 to 4.....$1.50 each
5 to 9..... 1.45 each
10 or more. 1.40 each
Lots of 100 1.20 each

Breeding Queens, service guaranteed for the season, $10.00 each.

JAY SMITH

ROUTE 3. VINCENNES, IND.

GOLDEN ITALIAN QUEENS

BRED FOR BUSINESS

Only one grade select. Safe arrival and satisfaction guaranteed.

Untested, 1, $1.25; 12, $12.00. Tested, $2.50 each.

1-lb. pkg. of bees and untested queens, $3.00; 2 lbs., $5.00. All mail charges paid.

E. A. SIMMONS - - GREENVILLE, ALABAMA.

You can have cash for your wax and old combs or cappings at the market price, or we allow a little more in exchange for supplies. Write for our terms and prices.

"Falcon"

SUPPLIES --- QUEENS --- FOUNDATION

W. T. Falconer Mfg. Company

Falconer, New York (near Jamestown)

"Where the best beehives come from."

Ask for catalog. *Booklet, "Simplified Beekeeping for Beginners," free.*

Bee Supplies

We Handle the Best Bee Supplies.

PROMPT SERVICE
SAVE FREIGHT
QUALITY GOODS

Ask for 64-page Catalog.

Root QUALITY BEE SUPPLIES

F. Coombs & Son
Brattleboro, Vermont

Caucasian Bees and Queens

After April 1st, I will offer some of my famous honey-gathering Caucasian stock of bees. This was the first stock imported into America, and has stood the test in commercial use. Three-frame nuclei with tested queen, $6.00. Tested queens, $2.00. Untested, $1.50.

DIXIE BEEKEEPER

All about Beekeeping in Dixie. Published monthly. $1.00 per year. Sample free.

WILDER'S CYPRESS HIVES

Are durable and satisfactory. A full line of beekeepers' supplies at low prices. Write for catalog.

J. J. WILDER, WAYCROSS, GA.

CHICAGO FOR QUALITY FOR SERVICE CHICAGO

When you get ROOT QUALITY BEE SUPPLIES from the greatest shipping center in America you get SATISFACTION. You get a superior grade of goods in QUALITY and WORKMANSHIP. Trains leave Chicago daily with connection for your station. Write for our new 1924 catalog. Let us quote you on your wants.

A. I. ROOT CO. OF CHICAGO

224-230 West Huron Street. *Chicago, Illinois*

Mr. Beekeeper

We have a large plant especially equipped to manufacture the supplies that you use. We guarantee all materials and workmanship. We ship anywhere. We allow early order discounts and make prompt shipments. **We pay the highest cash and trade prices for beeswax. Write for free illustrated catalog today.**

Leahy Mfg. Co., 95 Sixth St., Higginsville, Mo.

Texas Distributors—Albert M. Hunt & Sons, Goldthwaite, Texas.

ROADSIDE STANDS

PREPARE FOR SPRING BUSINESS

GLASS and TIN HONEY CONTAINERS	2½-lb. cans, in crates of 100	$4.00 a crate
	5-lb. pails, in crates of 100	7.00 a crate
	10-lb. pails, in crates of 50	5.25 a crate
	60-lb. tins, used, good condition, 2 tins per case	.25 a case
	60-lb. tins, new, 2 tins per case	1.00 a case
GLASS JARS WITH GOLD-LACQUERED, WAX-LINED SCREW CAPS	8-oz. honey capacity, 3 dozen per carton	$1.50 per carton
	16-oz. honey capacity, 2 dozen per carton	$1.30 per carton
	3-lb. or quart capacity, 1 dozen per carton	$1.00 per carton
HONEY	White Clover Crystallized in 60-lb. tins	$0.13 per lb.
	L. A. Clover Crystallized in 60-lb. tins	.12 per lb.

HOFFMAN & HAUCK, Inc. 1331 Ocean Avenue Woodhaven, N. Y.

Achord's Bees and Queens for 1924

ORDER NOW FOR APRIL AND MAY DELIVERY AND RESERVE YOUR SHIPPING DATE.

Prices April 15 to May 15th, Express Collect.

2-lb. package with select untested queen.$ 4.50
Five 2-lb. pkgs., select untested queens. 21.25
Twenty-five 2-lb. pkgs., sel. unt queens.100.00

3-lb. pkg. with select untested queen...$ 5.50
Five 3-lb. pkgs., sel. untest. queens.... 26.25
Twenty-five 3-lb. pkgs., sel. unt. queens.125.00

QUEENS.

Select untested, $1.25 each; ten, $11.50; twenty-five, $25.00. Select tested queens, $2.00 each.

TERMS: 20 per cent with order to secure reserved shipping date. Balance just before shipment. Safe arrival guaranteed. No bee disease in this district. Inspection certificate with every shipment.

We have two of the largest, best equipped queen-rearing apiaries in the South, also a series of outyards of fine honey-producing three-banded Italian bees which we run exclusively for package bees. We can give you the very best in bees, queens and service.

W. D. Achord, Fitzpatrick, Ala.

BEES ITALIAN BEES

APRIL SHIPMENTS.

2 lbs. of bees shipped on a frame of brood and honey, with select untested Italian queen.

1 to 24 packages.....$3.25 each
25 to 49 packages..... 3.15 each
50 to 75 packages..... 3.00 each

3 lbs. of bees shipped on a frame of brood and honey, with select untested Italian queen.

1 to 24 packages.....$4.75 each
25 to 49 packages..... 4.50 each
50 to 75 packages..... 4.25 each

MAY SHIPMENTS.

Same kind of package as above.

2-lb. size, 1 to 24.....$3.15 each
2-lb. size, 25 to 50..... 2.90 each
3-lb. size, 1 to 24..... 4.25 each
3-lb. size, 25 to 50..... 4.00 each

Safe arrival, satisfaction and no disease guaranteed. Health certificate accompanies each shipment.

E. J. BERIDON, JR., Mansura, La.

PURE THREE-BAND ITALIANS

MY QUEENS GIVE SERVICE.

Untested, $1.00 each; $90.00 per 100. 1924 Tested, $2.00 each.
Only good queens are shipped. No disease in my yards.

D. W. HOWELL, SHELLMAN, GEORGIA

ALUMINUM CHICK FEEDER for FEED, GRIT, MILK or WATER. Simple, safe and sanitary. Chicks cannot get feet into contents. Send 30c cash or stamps for one postpaid. Money back if not satisfied. **30c**
American Poultry Journal, 460-523 Plymouth Ct., Chicago

Patents Practice in Patent Office and Court. Pat. Counsel of The A. I. Root Co. CHAS. J. WILLIAMSON, McLachlan Bldg., Washington, D. C.

YOU BUY **BEES AND QUEENS** IN ONE OF TWO WAYS

? *On Trust or On Certainty* **4-hands**

You either know you are going to get good queens and bees or you hope you are. Hope may result in poor stock, delay, loss of colony and no honey. Knowledge means first-class stock, prompt delivery, courteous treatment, satisfaction and profit.

When you mail your order to FOREHAND you know you are buying QUEENS AND BEES on certainty. How about your next order?

Untested queens, 1 to 12, $1.00 each; 12 to 25, 85c each. One lb. bees with queen, $3.25; two lbs. bees with queen, $5.25; three lbs. bees with queen, $6.25; 10 or more packages of either, 25c less per package. POSTAGE PAID ON BEES AND QUEENS. Satisfaction and safe delivery guaranteed. REMEMBER THE PRICE IS PREPAID ON PACKAGE BEES. Write for prices on large lots.

N. FOREHAND -:- GONZALEZ, FLORIDA

Good Queens Pay for Themselves

Only prolific queens can give the thousands of nectar-gatherers necessary to harvest a 100 per cent crop.

MAKE YOUR COLONIES STRONG NOW WITH

Citronelle Queens

Queen-rearing has been our life study. Satisfaction guaranteed or money refunded.

Three-Banded or Golden Queens after April 1.

Select Untested—1 Queen, $1.20; 12 Queens, $11.00; 100 Queens, $85.00.
Untested—1 Queen, $1.00; 12 Queens, $10.00; 100 Queens, $75.00.
Tested—1 Queen, $1.50; 12 Queens, $17.00. Breeders, $5.00 to $25.00 ea.

Golden queens are reared five miles from other breeding yards. Package bees, nuclei or full colonies quoted on request.

BOOK YOUR ORDER EARLY. ONLY 10% REQUIRED. BALANCE BEFORE SHIPMENT.

The Citronelle Apiaries

Citronelle, Alabama

THIS month we are offering three-frame Nuclei with Selected Untested Queens.

Our nuclei go out with a heavy force of young bees. Light-colored three-banded only. Frames are standard, drawn from foundation on wire; nothing but the best we send you. Will start shipping April 29th in lots of 10 or more.

10 three-frame nuclei, with selected untested queen ..... $ 47.50
25 three-frame nuclei, with selected untested queen 112.50
50 three-frame nuclei, with selected untested queen 212.50
100 three-frame nuclei, with selected untested queen 400.00

Safe delivery guaranteed. Government health certificate with each shipment. Order now.

OSCAR MAYEUX

HAMBURG, LA.

QUEENS, $1.00

Mr. Beekeeper, if you want the very best queens and bees with prompt, efficient service at prices that you can afford to pay, order NORMAN BROS. queens and bees. Our queens and bees' service and prices meet these requirements. Mr. Beekeeper, when you introduce NORMAN BROS. queens you can feel assured you have a queen that is beautiful and will do her duty, and as good as any in the U. S. A., which is backed by years of improving and selecting from the finest mothers and mated to drones that are selected. Our bees are hardy, prolific, disease-resisting and honey-gatherers. Orders booked with one-fourth down, balance before shipment is desired. Place your order with us. We ship when you want them.

PRICES FROM APRIL 1st TO JUNE 1st.

Untested: 1, $1.00; 6, $5.50; 12, $10.00; 100, $72.00. Select Untested: 1, $1.20; 6, $6.50; 12, $12.00; 100, $90.00. Tested Queens: 1, $2.00; 6, $11.00; 12, $21.00. Sel. Tested, $2.50 each. One 2-lb. package bees with select untested queen, $4.50 each; 12 or more, $4.25 each. One 3-lb. package with select untested queen, $5.75 each; 12 or more, $5.50 each. GUARANTEE—We guarantee pure mating, safe arrival and satisfaction in U. S. A. and Canada.

NORMAN BROS. APIARIES, Naftel, Ala.

1924 Prices for Hummer Bees and Queens

2-pound package and untested Italian queen, one to 25, $4.25 each; over 25, $4.00 each.
3-pound package and untested Italian queen, one to 25, $5.25 each; over 25, $5.00 each.
Nuclei at same prices as above.

Beekeepers here for over 30 years. You will find us financially reliable, with the equipment to make prompt shipment as promised. No better bees and queens. On trunk line railway going north, insures quick service. 10 per cent of amount to book, balance just before bees are shipped. We replace all loss or refund money, at your option, promptly, on your sending us bad-order report from your express agent. Full-weight packages, and a square deal to all. Give us a trial.

GEO. A. HUMMER & SONS, Prairie Point, Mississippi.

TO **Next** IS

THIS IS NEXT TO SERVICE

Do you get good service at no cost?

OR

Do you fail to get good service at a heavy cost?

Let us send you a copy of our latest folder, "Service and Its Cost." It's free, and it may help you to solve a very difficult problem.

Our **THRIFTY BEES** and **GOOD SERVICE** are the result of thirty-two years of service to America's greatest honey producers.

UNTESTED QUEENS: 1, $1.00; 12 to 25, 85c; 25 to 50, 80c. Larger quantities and other grades upon application.

POUND BEES by express and parcel post at attractive prices.

-- W. J. FOREHAND & SONS --

FORT DEPOSIT, ALABAMA.

Queens, Package Bees and Nuclei

Can make shipments immediately. I am within ten hours of St. Louis. Can save you express charges and the bees from long confinement. Select three-banded Italian stock that get the honey. I guarantee pure mating, safe arrival and absolutely no disease. I allow extra weight on package bees because of the honey they contain when packed. If bees are not as represented, present your proof and I will refund your money, and let you keep the bees.

2-lb. package with young purely mated queen introduced, $3.50; twelve, $39.00.

2-frame nucleus with queen, $3.50; twelve, $39.00.

3-frame nucleus with queen, $4.25; twelve, $48.00.

QUEENS by return mail, $1.00 each; twelve, $10.00; 75c each when you book your order 60 days before queens are to be mailed out.

If you want good bees quick, send me your order at once; I will not disappoint you, neither will the bees. 25 per cent books your order.

Baughn Stone

CLARKSVILLE, TEXAS, P. O. BOX 26.

PRIZE WINNERS

Italian Bees and Queens

From Colonies that stored 200 lbs. of section honey during 1923. Shipment begins about April 15th.

2-frame Nucleus, untested queen, $4.25. 2 pounds combless package, untested queen, $4.25. Breeding queen, $5.00. Can furnish same as above from out-apiaries for $4.00.

W. S. JOHNSON

ALEXANDRIA, LA.

Mack's Queens

Are reared to suit the most particular beekeeper. They are hardy, gentle and very prolific. Every purchase must make us a satisfied customer or money back. Customers who purchased our queens sparingly the past season are now sending in their orders for 50 and 100 lots. If they did not satisfy, would such customers be so liberal? Just send for free catalog and read why they satisfy?

WE BREED THE THREE-BAND ITALIANS ONLY.

Untested—1 to 49, $1.00 each; 50 to 99, 95c each; 100 up, 90c each.

Select Untested—1 to 49, $1.25 each; 50 to 99, $1.20 each; 100 up, $1.15 each.

Capacity, 1000 queens per month.

HERMAN McCONNELL

ROBINSON, ILLINOIS.

MIDDLE TENNESSEE BRED

Select Three-Band and Golden Italian Queens will please you. Place your orders now for May first deliveries.

—PRICES—

Untested—1, $1.25; 6, $7.00; 12, $14.00. Select Untested—1, $1.50; 6, $8.00; 12, $16.00. Select Tested—1, $2.50, 6, $12.00; 12, $22.00.

Write for descriptive circular and prices per hundred.

All correspondence will receive prompt and careful attention.

MIDDLE TENNESSEE APIARIES

HARDIN S. FOSTER, Manager.

COLUMBIA, TENNESSEE.

OUR THREE-BANDED BEES AND QUEENS ARE MONEY MAKERS TO YOU

Let us book your order now and we assure you that you will receive prompt service and entire satisfaction. Give our package bees and queens a trial and get the splendid results that others are getting. My customers are sending in splendid reports from them. Read what one says:

"Your queens are just wonderful. On a poor honey flow here this year my pound packages gave me 150 pounds of extracted honey each. I have never had pound packages do so well before, and I have had a lot sent up from the South."

We pay all transportation charges.

1-lb. packages with untested queens, $3.25 each
1½-lb. pack. with untested queens, $4.25 each
2-lb. packages with untested queens, $5.25 each
3-lb. packages with untested queens, $6.25 each

25 cents less per package on lots containing 10 or more packages. 50 cents less per package on lots containing 25 or more packages.

Select Untested Queens, $1.00 each; 10 or more, 90c each.

Select Tested Queens, $2.00 each; 10 or more, $1.75 each.

We guarantee safe arrival, prompt delivery and entire satisfaction.

HAYNEVILLE APIARY CO., HAYNEVILLE, ALA.

1924 Nuclei With One Extra Pound Bees 1924

We are now booking orders for 1924 delivery. After several years' experience in shipping different sizes of nuclei and pound packages to nearly all parts of U. S. and Canada we have found the regular three-fr. size with one extra pound of bees to be the correct size to insure the purchaser a surplus crop of honey, provided the bees are received before May 15.

Over 1500 colonies will be operated, for the sale of nuclei. Booking capacity 2000 nuclei. For those who have become disappointed in results obtained from buying bees in package form, I would like to urge the purchase of some of our large three-frame nuclei with the extra pound of bees. Safe arrival and satisfaction guaranteed. Bees are absolutely free from contagious diseases. Bees will be shipped on combs built from full sheets of foundation nearly all brood capped. Send for circular telling more about our nuclei. Terms, 20 per cent with order, to guarantee acceptance. Balance before shipment.

"The bees arrived yesterday and they were the finest lot of bees I ever looked at. Not one comb broken."—Dr. Chas. S. Chadwick, Jackson, Mich.

"I am more than pleased with the 50 nuclei you sent me last year. Book my order for 50 more."—Robt. Hunter, St. Etienne de Beaucharnois, Quebec.

"I am much pleased with your stock and have recommended your bees to a number of beekeepers."—Otto W. Gall, Inspector of Apiaries, Binghamton, N. Y.

"Some of the nuclei you sent me have made 80 pounds surplus already."—Maurice Geary, Ironwood, Mich.

"The bees I received June 1st have made me nearly one super of surplus. The above speaks well for the extra bees."—Omar C. Curtis, Escanaba National Bank, Escanaba, Mich.

3-frame nuclei of Italian Bees and Queens	$5.00 each
25 lots or more	4.75 each
50 lots	4.50 each
100 lots	4.25 each
Queens, untested, $1.00 each, or	10.00 doz.

Write for prices for carload lots of full colonies in ten-frame hives, delivered.

ROOT QUALITY BEE SUPPLIES

A. R. IRISH, Box 134, Savannah, Ga.

Start Your Boy on the Road to True Manhood

Get **The Boys' Magazine** for him. He needs this great boys' periodical. Parents owe it to their sons to give them clean, interesting and instructive reading that will make them self-reliant, manly and courageous.

A SIX MONTHS' SUBSCRIPTION FOR ONLY 25 CENTS!

(This is ½ the regular price)

Each issue of **The Boys' Magazine** contains the very best stories by the world's best writers. Special departments devoted to Radio, Mechanics, Electricity, Athletics, Physical Training, Stamp Collecting, Amateur Photography, Cartooning, etc., etc. Beautiful big pages with handsome covers in colors. A big lot of jokes and comic drawings.

We give away $132.00 in Cash Prizes for the best amateur short stories, drawings, cartoons, articles on radio, mechanics, electricity, etc. There is no reason why YOUR boy should not win some of these cash prizes. These Prize Contests are continuous and each issue of **The Boys' Magazine** gives full particulars regarding them.

Just think of it! A SIX MONTHS' subscription for only 25 CENTS. It means six months of pleasure, entertainment and instruction for your boy, or for some boy in whom you take a particular interest.

Remit in stamps if more convenient.

(On sale at all newsstands, 10c a copy.)

THE SCOTT F. REDFIELD CO., Inc.
6254 Main St., Smethport, Pa.

I enclose 25 cents for a six months' subscription to THE BOYS' MAGAZINE as per your special half-price offer. Enter my subscription promptly and send me my first copy of THE BOYS' MAGAZINE by return mail. You agree to return my 25 cents at once should I not be more than pleased with THE BOYS' MAGAZINE.

My Name is.....

My Address is.....

.....

(Please write plainly)

GET OUR LOW PRICES ON

Standard Design Cypress Supplies

DOVETAILED HIVE BODIES, EXTRACTING SUPERS.

REVERSIBLE BOTTOM-BOARDS
COVERS
HIVES COMPLETE

We can make immediate shipment and save you money on supplies that will last a lifetime.

Gulf Coast Apiaries
Houma, La.

Early Order Discounts

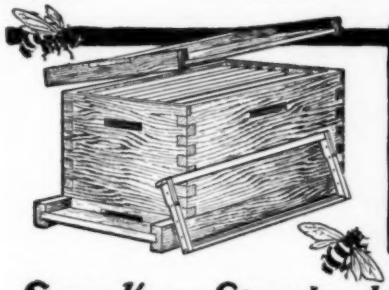
EVERYONE, including the beekeeper, is looking for a way to save money—this is one of them.

SECTIONS, SECTION HOLDERS, SEPARATORS, HOFFMAN BROOD FRAMES—ALL AT LIBERAL DISCOUNTS. Write in for quotations on the supplies you need for the 1924 season.

Orders forwarded immediately on receipt. Newly manufactured stock on hand with more in the process.

Charles Mondeng

146 Newton Ave. N. and
159 Cedar Lake Road.
MINNEAPOLIS, MINN.



HIVES
5 for $10.95
one story eight frame

Save ⅓ on Standard Hives

Ward's are standard hives, made of clear western pine, thoroughly kiln-dried, no knots. Made especially for us by one of the largest and best known manufacturers in the country. All parts accurately machined and close-fitting. Why pay more? Order your new hives direct from this advertisement. Catalogue number 187M5681—eight frame hives—price five for $10.95. Shipping weight 130 pounds.

We can start you in Bee-keeping

These hives are typical of Ward's Bee-Keepers' Supplies—low-priced but standard, serviceable supplies of every kind. We sell pure bred Italian Bees and Queens. Send for our General Catalogue No. 100 which shows our complete line of hives, sections, foundation, smokers, honey extractors, feeders—in fact, everything for amateur or professional bee keepers. Write to Dept. B-14.

Ward's is headquarters for bee keepers' supplies.

MONTGOMERY WARD & CO.

Chicago Kansas City St. Paul
Portland, Ore. Ft. Worth Oakland, Cal.

FREE

Write for General Catalogue showing all standard Supplies for Bee Keepers at lowest prices.

Write for Book Today

FARM WAGONS

High or low wheels—steel or wood—wide or narrow tires. Steel or wood wheels to fit any running gear. Wagon parts of all kinds. Write today for free catalog illustrated in colors.

ELECTRIC WHEEL CO., 23 Elm Street, Quincy, Ill.

World's Best Roofing
at Factory Prices

"Reo" Cluster Metal Shingles, V-Crimp, Corrugated, Standing Seam, Painted or Galvanized Roofings, Sidings, Wallboard, Paints, etc., direct to you at Rock-Bottom Factory Prices. Save money—get better quality and lasting satisfaction.

Edwards "Reo" Metal Shingles

have great durability—many customers report 15 and 20 years' service. Guaranteed fire and lightning proof.

Free Roofing Book

Get our wonderfully low prices and free samples. We sell direct to you and save you all in-between dealer's profits. Ask for Book No. 183

LOW PRICED GARAGES

Lowest prices on Ready-Made Fire-Proof Steel Garages. Set up any place. Send postal for Garage Book, showing styles.

THE EDWARDS MFG. CO.
433-483 Pike St. Cincinnati, O.

FREE Samples & Roofing Book

850,000 GRAPE-VINES

66 varieties. Also Small Fruits, Trees, etc. Best rooted stock. Genuine. Cheap. 2 sample vines mailed for 20c. Descriptive catalog free. West Hill Nurseries, Inc., Box C, Fredonia, N.Y.

KITSELMAN FENCE

'Saved $47.20 on 160 Rds.' says H. Thompson, West Union, Ill. **You, too, can save** by buying direct at Lowest Factory Prices.

WE PAY THE FREIGHT.

Write today for Free 100-page Catalog of Farm, Poultry and Lawn Fence, Gates, Posts and Barbed Wire.

KITSELMAN BROS. Dept. 21 MUNCIE, IND.

The Apiarist's Friend,

GERMAN SCYTHES AND SICKLES.

Permit the maximum work with the minimum disturbance of the colonies. Catalog on request.

THE MARUGG CO., Dept. B, Tracy City, Tenn.

BARGAINS IN BEES

THE STAPLETON APIARIES

During the past fall, The First National Bank of Colquitt, of which I was a stockholder and director, failed, due to a defalcation on the part of the president of the bank in excess of $100,000.00. I suffered a very heavy loss both directly and indirectly, and for a while it was a question whether or not I would be able to operate this season. I have now made my financial arrangements, but simply must raise some money this spring. While I do not like to cut prices, it is not a question of making money this season, but one of saving my investment. I have therefore decided to quote the following prices for spring delivery:

Untested queens, $1.00; dozen, $10.00. Tested queens, $1.50; dozen, $15.00.

One-pound package or one-frame nucleus with untested queen, $3.00; 10 or more, $2.75 each.

Two-pound package or 2-frame nucleus with untested queen, $4.00; 10 or more, $3.00 each.

Three-pound package or three-frame nucleus with untested queen, $5.00; 10 or more, $3.75 each.

READ CAREFULLY.

I have been in the bee business for about fifteen years and have the best stock I have been able to purchase or breed. My bees are three-band Italian; I guarantee purity of mating; I have no disease of any kind and there has never been any disease in this section of the State. Certificate of State Inspector with each shipment. I guarantee safe delivery and will replace or refund on receipt of bad-order certificate from the express agent at point of delivery. I do not recommend shipment by parcel post as I have found same unsatisfactory, but will ship by parcel post where this is desired for some special reason.

I can make shipment at any time after April 10. Have nearly 600 colonies from which to make shipment.

I can not reduce prices so much on one-pound package or one-frame nucleus, as it costs practically as much to prepare these for shipment as it does for a three-pound package. I recommend the purchase of a three-frame nucleus as I find that purchasers get best results from these.

I expect to need a large number of queens in moving bees at these prices and will probably not be able to fill all orders for queens. If in need of queens, I suggest that you place your order at once so I can make extra preparations.

I have furnished all bees and queens used by The Michigan Honey Producers' Exchange for the past two years, and have been local representative for R. G. Dun & Company for nearly 20 years.

Hoping to be favored with your orders, I remain, Yours very truly,

N. L. STAPLETON.
Colquitt, Ga.

Knight Pays the Transportation Charges on Package Bees

An item not to be ignored. Shipments via parcel post. They go through quicker.

100 nuclei, sent a party in Michigan last spring, averaged 263 pounds surplus honey. More than 400 per cent profit. Will give you his name and address upon request. Nothing but high-quality queens, breeders being selected for years from high honey-gathering colonies, can produce such high averages. No one, expecting to receive it, would give a dime for a poor queen.

PRICES TO JUNE 1.

1-pound package, including select untested queen	$3.25
2-pound package, including select untested queen	5.25
3-pound package, including select untested queen	6.25
10 or more packages, either size	25c per package less

THREE-BANDED LEATHER-COLORED ITALIAN QUEENS.

1 select (one grade) untested queen	$ 1.25
5 select (one grade) untested queens	5.50
10 select (one grade) untested queens	10.00
Select tested queens, each	2.00

Safe arrival of bees and queens, pure mating and perfect satisfaction guaranteed. Furthermore, I make good my guarantee. 10 per cent cash books your order. Will ship on the day you name, having the bees, men and equipment to handle all orders promptly. Should you find a queenless colony this spring send to me for a queen to save them. I will not disappoint you. No disease.

JASPER KNIGHT, HAYNEVILLE, ALABAMA.

Superior Italian Bees and Queens

One customer produced 20,000 pounds of surplus honey from 43 colonies of our SUPERIOR ITALIAN BEES and our prices are as low as anyone can make on the same quality goods.

Two-pound package and 2-frame nucleus with queen, $4.50; ten or more, $4.00.

Three-pound package and 3-frame nucleus with queen, $5.50; ten or more, $5.00.

	To June 15.	After June 15.
One Untested Ital. queen..	$1.25	$1.00
Ten or more.....	1.00	.75
One Tested Italian queen..	2.00	1.25
Ten or more.....	1.50	1.00

OUR GUARANTEE ON EVERYTHING.

We guarantee all bees and queens to reach you in good condition. If queens do not, return them in their cages. If bees do not, send express receipt with notation of damage and we will replace or refund your money, whichever you advise.

Save This Difference in Prices

We guarantee all supplies to be of good material and workmanship. If they are not we will make satisfactory adjustment.

100 10-frame shallow dovetailed supers, with frames $70.00
25 10-frame shallow dovetailed supers, with frames..... 18.75
100 8-frame shallow dovetailed supers, with frames 62.00
25 8-frame shallow dovetailed supers, with frames..... 16.75
Med. brood fdn., lots of 5 lbs., 64c; in 25-lb. lots, 58c, or just a little over 4c a sheet.
100 10-frame full-depth supers or bodies, with frames.....$115.00
100 8-frame full-depth supers or bodies, with frames 105.00
All bodies made of good cypress and dovetailed.
Med. brood fdn., 5 lbs., 64c; in 25-lb. lots, 58c, or only a little over 7c a sheet.
Send 10c for a sample Hoffman frame and save more than $10.00.
500 Regular Hoffman frames.....$23.00
Good used 7-wire and wood excluders, each 50c

WRITE FOR OUR 1924 CATALOG.

THE STOVER APIARIES, MAYHEW, MISS.

For years we have been shipping thousands of pounds of bees all over the U. S. and Canada

Order Direct from this Ad.

WE ARE PREPARED TO TAKE CARE OF YOUR RUSH ORDERS.

* * * * * * * *

2-lb. pkg. bees, $3.75 each, 25 or more, $3.60 each.
2-frame nuclei same price as 2-pound packages.
3-lb. pkg. bees, $5.25 each; 25 or more, $5.00 each.
3-frame nuclei same price as 3-pound packages.

* * * * * * * *

Untested Queens, $1.00 each; 25 or more, 85c each; $70.00 per hundred. This is a special SALE on untested queens of high quality.
Select untested, $1.70; 25 or more, $1.50 each.
Select tested, $2.65 each; 25 or more, $2.25 each.
Tested, $2.25 each; 25 or more, $2.00 each.
Breeders, $5.00 to $15.00.

* * * * * * * *

Italians - Carniolans - Goldens

THE AULT BEE COMPANY, San Antonio, Texas

Successors to Nueces County Apiaries

For Real Success You Should Buy

Woodman's Inner Overcoat Hives

BEE CAUSE:

1. **Protected Bees work day and night.** It has been shown by careful observation that maintaining a temperature of 98 degrees permits comb-building to go on **both day and night.** The bees will thus devote more daylight time to gathering honey.

2. **Larger Honey Crops are assured.** The bees are enabled to rear brood earlier in the spring, with no danger of chilled brood on account of cold snaps. One bee in March is worth one hundred in July.

3. **You will practically eliminate winter losses.** With your colonies in normal condition (that is, with plenty of good stores, a young queen and young bees) you will be able to winter practically 100%.

4. **The Inner Overcoat Hive will last a lifetime,** as the outer hive walls are the same thickness as in the single-wall hive. In other words, WOODMAN Inner Overcoat Hives are a lifetime investment—not an expense.

5. **Out-of-door Wintered Bees have many advantages** over cellar-wintered bees. They do not spring-dwindle and are stronger at the opening of honey flow.

6. **Insures Close-up Protection.** A person may have any amount of blankets fastened up to the wall of his room and still freeze to death if left in the center of the room without close-up protection or insulation. **The close-up protection in the Inner Overcoat Hive is what does the trick.**

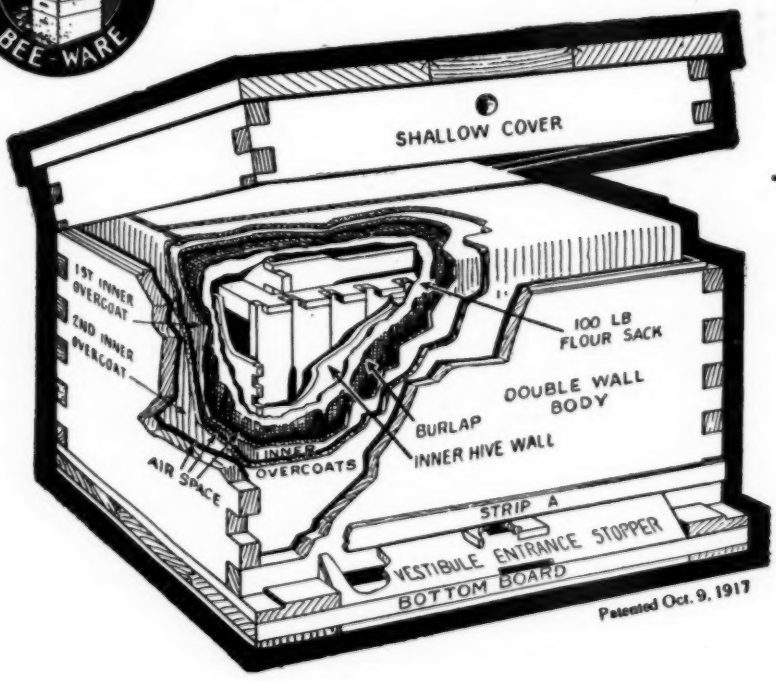
Special circular on WOODMAN'S Protection Inner Overcoat Hive, showing 10 large illustrations, sent on request.

WOODMANS FAMOUS BEE-WARE

A. G. WOODMAN COMPANY

Sole Makers

238 Scribner Ave., N. W., Grand Rapids, Mich.



The Diamond Match Co.

APIARY DEPT.

Manufacturers of

BEEKEEPERS' SUPPLIES

CHICO, CALIFORNIA, U. S. A.

The entire resources of this great plant are now near to you

The Diamond Match Co.'s Factories and Yards at Chico, Calif., cover 220 acres.

To meet the ever increasing demand for "Diamond" Beekeepers' Supplies, distributing warehouses have been established at Woodhaven, New York (Hoffman & Hauck); St. Louis, (The Diamond Match Co.); New Orleans, (The Diamond Match Co.). This will enable Beekeepers to obtain their supplies promptly and at a greatly reduced cost.

PRICE

Every dollar paid stands for actual value received; no money that is paid us is wasted in inefficient methods or by lack of intelligent foresight. From the falling of the tree to the finished hive, no middleman takes out a profit; full advantage of this saving is given to the purchaser.

Our emblem the "Diamond" is protected by excellence of workmanship.

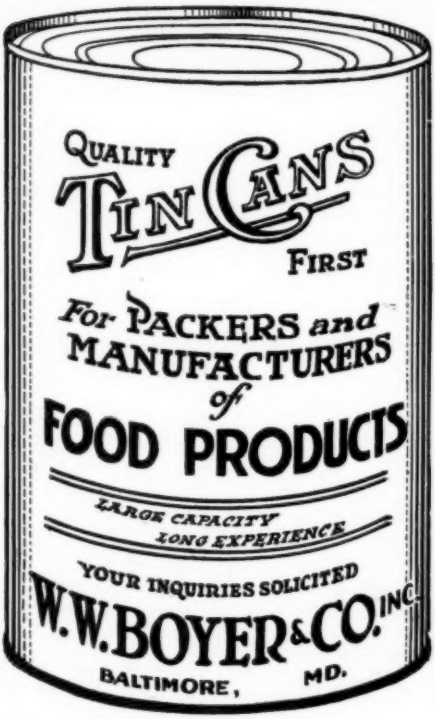
THE DIAMOND POINTS OF DISTRIBUTION.

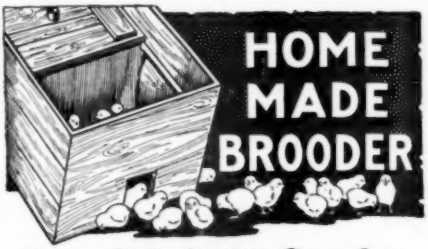
QUALITY

Diamond Hives, etc., which are manufactured from Sugar Pine from our own forests, present every desirable feature, and embody every improvement in design and betterment in construction. Diamond Hives have a reputation for high quality well nigh world-wide.

Beekeepers who study economy should consider the use of the Diamond Standard Supplies in their apiary. Diamond Foundation is uniformly excellent and means Foundation Satisfaction.

Write the Diamond Match Co., Apiary Department, Chico, California, for free catalog. Send all orders and inquiries to Chico, Calif. Shipment will be made from nearest distributing point named above.





Costs Only $4.96, Complete

In an hour you can make a better brooder than you can buy. No tools needed but saw and hammer. It will do the work of 4 old hens and do it better. The materials, including heater, cost $4.96.

I want you to try my Brooder and will send you plans for making it, together with a Putnam Brooder Heater, for $4.75; all postpaid. Try the Brooder out and if you don't say it's the best Brooder you ever used, return the Heater in 30 days and get your money back. Your dealer will make you the same offer and guarantee. Ask him, but if he does not carry the Brooder Heater, send me $4.75 and I will mail you a Brooder Heater and plans promptly. Illustrated circular free.

I. PUTNAM
Route 460-B Elmira, N.Y.

$4.75 Post Paid
Burns 10 days without attention

Root Quality Queens and Bees

A good queen is absolutely necessary to the success of any colony of bees. The queen that improves the honey-gathering qualities of the bees adds to the profit of the beekeeper. We are making an honest effort to produce the best queens obtainable, and also to sell them at the lowest prices consistent with cost of highest-class production. We will not cheapen our queens to lower the price.

QUEEN PRICES APRIL 15 TO OCTOBER 15.

Quantity:	1 to 9.	10 to 24.	25 to 49.	50 to 99.	100 or over.
Untested	$1.50 ea.	$1.35 ea.	$1.25 ea.	$1.10 ea.	$1.00 ea.
Select Untested...	2.00 ea.	1.80 ea.	1.70 ea.	1.55 ea.	1.45 ea.
Tested	2.50 ea.	2.25 ea.	2.10 ea.	2.00 ea.	1.85 ea.
Select Tested.....	3.00 ea.	2.70 ea.	2.55 ea.	2.40 ea.	2.25 ea.

The best beekeeping authorities agree with us in the opinion that the shipping of bees on combs containing honey and brood invites the spread of disease. We are now shipping bees only in combless packages.

PRICES OF BEES IN TWO-POUND COMBLESS PACKAGES BY EXPRESS, APRIL 15 TO AUGUST 15.

	1 to 9 pkgs.	10 to 24 pkgs.	25 or more pkgs.
2-pound package of bees..	$6.00 each.	$5.50 each.	$5.00 each.

Add prices of queens wanted to package price given above. Large quantity lots quoted on application. These prices are f. o. b. shipping point. Note: Early spring delivery on package bees will be made from Bay Minette, Ala. Beginning May 20, package orders can be filled from Medina.

THE A. I. ROOT COMPANY, West Side Station, Medina, Ohio